



VIET NAM POPULATION AND HOUSING CENSUS 2009

AGE-SEX STRUCTURE AND MARITAL STATUS OF THE POPULATION IN VIET NAM



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PREFACE

The Viet Nam National Population and Housing Census 2009 was conducted at 00:00 on April 1st, 2009 under Prime Ministerial Decision No. 94/2008/QĐ-TTg dated July 10th, 2008. This was the fourth population Census and the third housing Census conducted in Viet Nam since 1975. The purpose of this Census was to collect basic information on population and housing of the Socialist Republic of Viet Nam for national development planning for the period 2011–2020.

Besides the major findings of the national population and housing Census, which were published in July 2010, in-depth analysis of some important issues including birth, death, migration, urbanization, age-sex structure of the population, and education was undertaken to provide important information about the current status as well as appropriate policy recommendations related to these issues.

The monograph “Age-sex structure and marital status of the population in Viet Nam” was developed using the data of the 15% sample survey which was included in the VNPHC2009 in order to provide the readers with the most up-to-date information about Viet Nam’s age-sex structure and marital status.

Analysis shows that the current age structure of the population in Viet Nam is typical for a population which has recently completed its transition from high to low mortality and fertility. The age and sex structure in Viet Nam suggests certain new demographic features including a golden population structure, population ageing and household characteristics typically seen at the completion of population transition. Analysis on marital status in Viet Nam reflect the trends towards later marriage age and higher singulate mean age at marriage. However, early marriage and child marriage still exist among ethnic minority groups.

This monograph also suggests some policies to respond to demographic changes including to take advantage of the population structure and improve the quality of the young labour force, enhance healthcare/reproductive health and professional training for the young population while ensuring social security for the elderly.

The Viet Nam General Statistics Office (GSO) would like to express its special thanks to the United Nations Population Fund (UNFPA) for their financial and technical support in the VNPHC2009, especially for data analysis and preparation of this monograph. We also would like to express our sincere thanks to Dr. Nguyen Duc Vinh from the Institute of Sociology and Mr. Nguyen Van Phai - independent consultant, for their great efforts in analyzing data and developing this monograph. Our gratitude also goes to other national and international experts, UNFPA staff, and GSO staff for their hard work and valuable inputs during the development of this monograph.

We are honoured to introduce a special publication with an in-depth look into the age-sex structure of the population and marital status, which is now a topic of interest among researchers, managers, policy makers as well as the whole society. We look forward to your feedback and comments on this monograph to improve the quality of future GSO publications.

General Statistics Office

SUMMARY OF FINDINGS

This monograph presents results from in-depth analysis of the age-sex structure, household structure, and marital status of the population in Viet Nam based on data from the 2009 Viet Nam Population and Housing Census.

• AGE-SEX STRUCTURE

The analysis reveals that, the age-sex structure of population in Viet Nam in 2009 is typical for a population that has recently completed the demographic transition from high to low fertility and mortality. The proportion of children declined while the proportion of the elderly increased. In rural areas, the proportion of the age group 15–19 is highest and is much higher than in the adjacent age groups. In urban areas, the proportion of the age group 20–24 is largest but only slightly higher than adjacent age groups.

Age-sex structures of population in geographical regions and provinces are shaped not only by fertility and mortality but also migration. The age pyramids of the Northern Midlands and Mountains are typical for populations with high fertility and mortality rates. The age structure of population in the Central Highlands is also influenced by in-migration.

The populations in the Red River Delta and Mekong River Delta have low fertility and mortality rates, leading to lower proportions of children and higher proportions of the elderly than in other regions. As the net migration rate in the Red-River Delta is negative and a out-migrants are mainly in working ages, the proportion of the population in working ages is relatively low. The age pyramids of the Central Coast - North and South reflect populations with high migration rates. The proportion of population in the age groups 20–24 and 30–34 in the North and South Central Coast are low as there is a high out-migration rate of young adults. In contrast, the proportion of the population in the age group 20–24 in the Southeast is relatively high as there is a high in-migration rate among the young ages.

The total dependency ratio of Viet Nam has declined dramatically since 1979. If the population aged 15–64 is considered as the non-dependent group, Viet Nam's total dependency ratio had reached the level of a "golden population structure" (<50) by the end of 2007, and fell further to 44.7 by 2009. The decline in the total dependency ratio in Viet Nam is mainly caused by the drop in the fertility rate, while the decrease in the mortality rate has led to a slight increase in the old-aged dependency ratio. Among the six geographical regions, the Southeast, Mekong River Delta, Red River Delta, and Northern Midlands Mountains are experiencing a period of "golden population structure". The North and South Central Coast is expected to achieve a "golden population structure" by 2011. In 2009, 43 of 63 provinces/cities in Viet Nam have obtained a "golden population structure". The provincial total dependency ratio is lowest in Binh Duong (28) and highest in Lai Chau (71). Among the ten largest ethnic groups, six groups have entered the "golden population structure". The Gia Rai and Hmong are the two ethnic groups with the highest total dependency ratio (72.9 and 95.0 respectively).

The population of Viet Nam is aging rapidly as reflected in the aging index (60+) increasing from 18.2 in 1989 to 24.3 in 1999, and 35.5 in 2009, with the expectation of further increases in the future. In 2047, the number of people in old age will be 1.5 times higher than the number of children. The seven provinces with the highest aging indexes (>50) are Ha Tinh, Hung Yen, Ninh Binh, Nam Dinh, Hai Duong, Ha Nam and Thai Binh.

The sex ratio of Viet Nam's population was 97.6 males per 100 females in 2009. However, the sex ratio of the under-15 population in 54 provinces/cities is higher than the normal level (>105). This will lead to the situation of male surplus and female shortage among the marriage age population in the near future.

The number of women aged 15–49 will continue to increase until 2028 (an increase of about 75 thousand women per year) and decline afterward, but the proportion of women aged 15–49 has peaked at the highest level in 2009. Thus even if the TFR remains at the present level (TFR=2.03), the number of newborns will continue increasing in the next decade or so, but the crude birth rate in Viet Nam will gradually decrease.

• HOUSEHOLD STRUCTURE

Similar to the age and sex structures, household structure of Viet Nam's population has significantly changed in the last three decades during the demographic transition. The average size of households declined quickly, from 4.8 people in 1989 to 4.5 in 1999 and 3.8 in 2009. Households with four members are the most common in Viet Nam accounting for 28.5% at present. The reduction in household size is mainly caused by the remarkable drop in the number of children under 15.

From 1999 to 2009, the proportion of one-person households in Viet Nam has risen from 4.4% to 7.3%. Meanwhile, the proportion of one-person households with people in older ages (65+) has increased 1.5 times, from 1.8% to 2.6%. Most people living in one-person household are females, especially those aged 45 or older.

Because of fertility decline, the proportion of households with children aged under 15 also dropped rapidly, from 85.9% in 1989 to 58.0% in 2009. The proportion of households with people in older ages has not changed much. The proportion of household without dependents has more than doubled, from 14.3% in 1989 to 30.8% in 2009, while the proportion of households with at least half the members in dependent ages has decreased from 53.8% to 33.5%.

Until 2009, most household heads in Viet Nam were male and this tendency seems to have increased (from 68.1% in 1989 to 72.9% in 2009). Most male household heads are married (93.3%) while the proportion of female household heads who are married is significantly lower (40.3%), especially in rural areas (32.5%). The proportion of never-married people among household heads has notably increased during the last two decades (from 2.6% to 5.7%), especially among female household heads in urban areas (from 5.2% to 15.5%) .

In short, common trends seen among Viet Nameese households include a decrease in household size; an increase in one-person households; and a decline in the dependency ratio. These are typical characteristics of households in populations completing their demographic transition. However, the traditional pattern of primarily male-headed household persists in Viet Nam. In addition, there is notable variation in these characteristics across geographical regions with different cultures and living standards.

• MARITAL STATUS

In the last two decades, general features of marital status in Viet Nam included earlier marriage among females than males, a majority of the population ever married by the age 50, and in most age groups, the proportion separated or divorced among females higher than among males. In 2009, the proportion married among people aged 35-39 years was nearly 90% and the proportion was even higher for males and in rural areas.

However, there is a clear tendency of increasing mean age at first marriage in Viet Nam. Until 2009, more than 50% of women over age 60 lived outside of marriage, while for men this was only the case after age 85. Compared with two decades ago, the contemporary trend is for women to marry later, and to have a higher probability of being married by the age of 40.

The proportion widowed among females is always higher than among males (about 8-10 times higher for age groups under 60 and from 3 to 6 times higher among age groups above 60), but there is not much difference between rural and urban areas. The proportion widowed is lowest in the Red River Delta and highest in the Mekong River Delta (for men) and in the Central Highlands (for women).

The probability of being divorced/separated among females is usually much higher than among males, both in absolute and relative terms. For the population aged 15 and older, the proportion is 0.9% for males and 2% for females, equivalent to about 287 and 658 thousand individuals respectively. The age group with the highest rate of divorce or separation is the age group 40-44 for males (1.6%) and 50-54 for females (4.4%). The rates of divorce or separation in the Southeast and the Mekong River Delta are much higher than in other four geographical regions. For females, the rate of divorce or separation in the Southeast among people aged 30-70 is remarkably higher than in the other regions. In general, divorce/separation in Viet Nam is associated with low educational levels, middle aged women, infertile women, non-working men, memory disabilities, Kinh ethnic group, urban residence, living in the Southeast, and men living in the Mekong River Delta.

In 2009, the singulate mean age at marriage (SMAM) was 26.2 years for males and 22.8 years for females. Both female and male SMAM in urban areas was higher than in rural areas. The SMAM is lowest in the Northern Midlands and Mountains, followed by the Central Highlands, and is highest in the Southeast. Among ethnic groups, the SMAM is highest for the Kinh majority, and lowest for the Hmong. Educational attainment is one of the factors strongly affecting age at first marriage. Early marriages in the north-western provinces of the Northern Midlands and Mountains are relative common. Rural women in the Central Highlands and Mekong River Delta, and both males and females in the rural north-western provinces of the Northern Midlands and Mountains, especially the ethnic groups with low education levels, should be the key target groups of policies discouraging child and early marriages in Viet Nam. Early termination of schooling, early marriage and early labour force participation are three strongly correlated issues.

Late marriage has become more prevalent. In 1999, there were about more than 84 000 males (1.1%) and 371 000 females (3.8%) aged 40 or older who had never been married. In 2009, the corresponding numbers are more than 210 000 males (1.7%) and 635 000 females (4.4%). Late marriage is always more frequent in urban areas than in rural areas, more frequent in the Southeast and the Mekong River Delta than in other regions, and relatively widespread in the group with low education level, especially people with vision or memory disabilities.

• POLICY RECOMMENDATIONS

Even with the total fertility rate of Viet Nam under the replacement level and continuing to decline, the population in Viet Nam will still increase by more than 9 million over the next decade. Thus, it is necessary for Viet Nam to have suitable policies so that this increase will not hinder economic development, poverty reduction, and living standards improvement, but instead will facilitate implementation of these goals.

It is projected that the number of women aged 15–49 will continue to increase until 2028 but that the rate of increase will decline remarkably in comparison to the last decade. Specifically, over the next decade, the number of women in reproductive ages will increase by about 75 000 people per year. Thus, the demands on reproductive health and family planning services will continue to increase in the near future, but not as rapidly, so the government will be able to focus more on improving quality of reproductive health service systems and family planning programs instead of focusing only on expanding them.

It is expected that the absolute number and proportion of children aged 0–14 in the population will decline (though the absolute number increase slightly in the next decade before declining). This creates conditions amenable to investment per capita to rise in order to improve the quality of education and healthcare systems for children and youth and thus to improve the quality of the labour force in future generations.

The total fertility rate in Viet Nam has fallen below the replacement level and may continue to decline. Therefore, it is necessary to prepare a strategy to ensure that the total fertility rate does not fall below 1.8, or even better, that total fertility is maintained at replacement level (2.1). This will help to avoid the situation of a population structure that is too old and future labour shortages.

The period of “golden population structure” in Viet Nam will continue over the next 3 decades. This is a unique opportunity in which the most favourable demographic structure possible can promote the process of industrialization and modernization in Viet Nam. However, one major constraint is the relative low quality of the labour force. In order to take full advantage of the golden population structure to boost the economy, it is necessary to reduce the unemployment rate and to increase the number of jobs requiring highly-qualified and highly productive labour. Therefore, Viet Nam needs to have policies to strengthen investments for development, especially to enhance the quality of the young labour force through health, education and high-tech training programs.

Population aging is not an urgent issue so far but needs to be taken into account soon as the proportion of the population aged 60 and older will increase quickly. In particular in Viet Nam, many elderly people are economically dependent on others and suffer from many chronic and acute diseases. They will face severe difficulties in their lives, if social protection policies are insufficient or ineffective.

Policies on social insurance, health insurance, and retirement need to be more responsive to population aging, smaller family size, increasing proportions of old people living in one-person households and a large number of people being widowed, especially women. It is crucial to have policies to increase the self-reliance of the elderly as well as to encourage families and communities to be more responsible towards the elderly. More importantly, it is recommended to modernize social insurance programs, to achieve wide-spread coverage and sustainability in the market economy.

Concretely, contributions to the social insurance fund of people in working ages should be in line with the basic costs of living of people when they leave working ages in the future, especially for current workers who are benefitting from the golden population structure. These strategies should be included in the Labour Law, the Law on the Elderly, the Law on Social Insurance and other relevant policies.

It is necessary to carry out stricter policies to prevent the increasing sex ratio at birth, particularly information and communication campaigns affirming and promoting women's status in the family and society and eliminating the attitude of "respect men and disdain women". However, Viet Nam needs not only to prevent it, but also to cope with the situation of surplus male population in the near future. Experiences from Korea, Taiwan, China and India may provide lessons to help establish appropriate policies.

The government needs to continue communication programs and apply more effective methods to reduce the relatively high rates of child and early marriages in some provinces, especially in the Northern Uplands among several ethnic groups. In addition, it is essential to have more comprehensive studies to establish appropriate policies to cope with the increase in divorce and separation, especially in urban areas, and in the Southeast, and the Mekong River Delta. It appears that proactive investment in education is a basic and long-term solution to resolve the problem of early marriage as well as divorce and separation.

In general, Viet Nam's population has been experiencing extensive changes in quantity, quality, and structure, and is gradually moving to the period of post-demographic transition. However, these changes vary remarkably across population groups as well as geographical regions. Therefore, policies on population, marriage, family, and development should be flexible and applied in a way that responds to the diversified demographic features in Viet Nam that vary across region and ethnicity. For instance, the government should continue the policies for population in the process of demographic transition in the Central Highlands, Northern Midlands and Mountains, disadvantaged provinces, and ethnic minority groups. On the other hand, effective policies dealing with emerging issues for a post-demographic transition population are also necessary, especially in the Red River Delta and the Southeast, other economically developed provinces and cities.

It is recommended to implement more comprehensive studies on persistent population and family issues, such as child marriage, gender inequality, or emerging issues such as population aging, divorce and separation, delayed marriage, one-person households. It is necessary to examine the relationships of these issues with economic, cultural, and social factors for the improvement of relevant policies. In addition, it is crucial to implement more detailed population projections at both national and provincial levels to provide necessary information for medium and long-term planning and policy making, in order to fully mobilize the potential of demographic dynamics for socio-economic development in Viet Nam.

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ABBREVIATIONS

CPHCSC	Central Population and Housing Census Steering Committee
GSO	General Statistics Office
IMR	Infant Mortality Rate
SMAM	Singulate Mean Age at Marriage
TFR	Total Fertility Rate
UNFPA	United Nations Population Fund

CHAPTER 1: INTRODUCTION

1.1 GENERAL CHARACTERISTICS OF POPULATION IN VIET NAM

At the time of the 1979 Census, the population of Viet Nam was in the middle of the demographic transition¹ with a total population of 52.7 million people, the TFR was more than 5 children and life expectancy was under 60. The population in this period reflected several vestiges reflecting consequences of the wars that occurred over previous decades. In the following decades, Viet Nam has made remarkable efforts to implement population and family planning programs and public health measures. Also in this period, the economy of Viet Nam has developed rapidly, changing from a subsidized, central planned and stagnant economy in the 1980s toward a market economy with average economic growth above 8% per year since 1986.

In the three decades after the 1979 Census, the population of Viet Nam underwent dramatic change. In 2009, the total population was almost 85.8 million; the TFR had declined to 2.03; and life expectancy at birth had increased to 72.8 years. The immense decline of fertility and mortality rates have strongly contributed to changes in age and sex structure of the population in Viet Nam. In addition to the demographic transition, the development of the economy and other changes in society have substantially influenced household structure and marital status in Viet Nam. Therefore, it is necessary to establish and to implement socioeconomic development policies that are appropriate with the situation, structure, dynamics and trends of the contemporary population in Viet Nam

1.2 MAIN OBJECTIVES

This monograph uses data from three population and housing Censuses that took place in Viet Nam in 1989, 1999 and 2009 to examine the age-sex structure of population, the structure of households, and marital status. The analysis aims to achieve the following objectives:

First, to assess the quality of age reporting and the possibility of using total- enumeration data from the Population Censuses in 1989, 1999, and 2009 to analyze the age-sex structure of population in Viet Nam.

Second, to describe and to analyze the situation and trends of the age-sex structure of the population in Viet Nam over the three Censuses that took place in 1989, 1999, and 2009. The analysis will concentrate on changes in the population pyramid, the sex ratio, the dependency ratio, and the aging index of the population in Viet Nam.

1 Demographic transition is the process in which population changes from high to low birth and death rates in three stages. Stage 1 with high birth and death rates and slow population growth. Stage 2: decreasing birth and death rates, with faster declines in death rates than birth rates leading to rapid population increase. Stage 3: both low birth and death rates allowing population to become stable.

Third, to describe and analyze the status and trends in household structure of Viet Nam in 2009 in compared with that in 1989 and 1999 using sample Census data. In particular, the analysis focuses on household size, sex of household head, dependency ratio of households, and some characteristics of one-person households.

Fourth, to describe and to analyze marital status of the population aged 15 and over in Viet Nam in 2009 and its relationship to some selected demographic factors using sample Census data. The monograph focuses on structure of marital status by age, sex and by geographical region. The analysis also addresses the situation of early marriage including child marriage, delayed marriage, divorce and separation, and their relationships to other demographic characteristics.

The final objective and, also the overall goal of the monograph, is to provide up-to-date information and appropriate policy recommendations based on the above analysis. It is expected that the monograph will be a useful material for researchers, managers and policy makers, who are interested in population, marriage and family, labour force, social welfare and other relevant issues in Viet Nam.

1.3 INTRODUCTION OF SAMPLE DATA FROM THE 1989, 1999 AND 2009 POPULATION & HOUSING CENSUSES

Population Censuses often record only some basic demographic indicators of total population. The three latest Censuses in Viet Nam (1989, 1999 and 2009) also included subsamples of respectively 5%, 3% and 15% of the total population for which more detailed information was collected. The sample data in the 1989 and 1999 Censuses are representative of the population at the provincial level, while the sample data in the 2009 Census are representative at the district level. Weight or expansion factors are provided with the sample dataset to enable extrapolation to obtain estimates for the total population (see CPHCSC 2010).

Table 1.1: Key characteristics of Census sample data, 1989-2009

	1989	1999	2009
Date	1/4/1989	1/4/1999	1/4/2009
Total households	534 177	534 139	3 692 042
Total population covered	2 626 988	2 368 167	14 177 590
Sampling rate	5%	3%	15%

The analysis of households and marital status in this monograph uses the following key information from the sample data: age, sex, ethnicity, geographical regions (regions, province/city, urban/rural), educational attainment, religion, household size, and sex of household head. In order to avoid sampling errors, total enumeration data are used in the analysis of age-sex structure at the national and provincial levels. This monograph also uses sample data for the analysis of migration, employment, and disability status.

Advantages of the sampled data from three Censuses in 1989, 1999 and 2009 are that they are

representative not only at the national level but also at the provincial level; the sample sizes of households and individuals are large, and sampling errors are relatively small for most estimates. In addition, most indicators are similar across the three Censuses, which allows reliable comparisons between 1989, 1999 and 2009. The main limitation is that these sample datasets include only key socio-demographic indicators, which are not enough for in-depth and comprehensive analysis such as can be performed with data from other household surveys. In addition, several crucial indicators for the topic of the monograph, including directly calculated marriage rates, divorce rates, and type of household, cannot be directly obtained or estimated from the sample data.

1.4 METHODS AND TECHNIQUES

Because the main objective of the monograph is to describe and to compare the age-sex and marital structure of the population, the main methods are descriptive tools, such as cross-tabulation, charts, population pyramids, and maps.

The assessment of data quality will address the following issues: age-heaping, over-age reporting for elderly people, under-reporting of children under age 5. Data on age (or year of birth) from the Censuses or other surveys in general, may exhibit heaping in some ages, as a result of digit preference or rounding, usually to numbers ending in 0 or 5. Substantial age heaping would considerably influence analysis results. Assessments of age heaping is done using Whipple's index, Myer's index or Bachi's index (United Nations, 1993). The general hypothesis in applying these indices is that the actual age structure in a population exhibits gradual variation. Age data exhibits age heaping if there is a concentration of people reported in ages with specific ending digits. These kind of indices can be also calculated for year of birth instead of age. Whipple's index and Myer's index are applied in Chapter 2 of this monograph to assess quality of age data.

Population projection techniques are employed to estimate the population structure of Viet Nam in the near future. A basic and simple type of population projection is to calculate the population by sex and age in the future based on some "rational" hypotheses about fertility rate, sex ratio at birth, mortality rate, and migration in the corresponding periods (Hinde 1998). Besides the estimates of future population, population projection is also applied in Chapter 2 to assess the level of over-reporting of age among the elderly and under-reporting of children under five years of age. The definitions of several indicators and measures of population structure, such as the sex ratio, the dependency rate, the aging index, are presented in Chapter 3.

In order to compare the impact of various indicators on change in household size, a modification of the decomposition method from Dandekar and Unde (1967) is employed. In this method, the household headship rates are decomposed into five components, including indices of nuclear family, marriage, interrupted marriage, sex ratio, and population structure (or proportion of adults). More details of this method are presented in Chapter 4.

In Chapter 5, the mean age at first marriage is estimated from the proportions never married using an indirect method because information about starting point of marital status (at the time of the Census) is missing. Based on life table techniques, this method estimates singulate mean age at marriage (SMAM) as the ratio between the total person-years not yet married among the people who (will) marry by the age of 50 to the total number of people who (will) marry by the age of 50 (United Nations 1983).

Chapter 5 also applies the logistic regression technique to estimate and analyze the relationship between dependent variables (probabilities of early marriage, late marriage, and divorce/separation) and independent variables (some socio-demographic indicators such as urban/rural residence, geographical region, age, sex, ethnicity, religion, educational attainment, working status, migration, and disability). Basically, the construction of a logistic regression model is done in order to estimate the following equation based on observed data:

$$p = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + \varepsilon)}}$$

or

$$\ln\left(\frac{p}{1-p}\right) = (\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + \varepsilon)$$

Of which, p is the probability for the dependent variable; x_i are independent variables; β_i are the regression coefficients, ε is error, and $p/(1-p)$ is the odds ratio of p (see Hosmer & Lemeshow 2000). Results from the regression model allow analysis of the relationship between each independent variable and the dependent variable, holding all other independent variables in the model constant (bivariate cross-tabulations do not allow such comparisons). Although they are called dependent variable and independent variables in this monograph, the analysis does not necessarily indicate causal relationships because the analysis is based only on cross-sectional data. More detailed explanations of the logistic regression techniques used will be presented in Chapter 5.

1.5 OUTLINE OF CONTENTS

The monograph consists of 6 chapters whose content is in line with the objectives mentioned above:

Chapter 1. Introduction

Chapter 2. Assessment of data quality and data adjustments

Chapter 3. Age-sex structure

Chapter 4. Household structure

Chapter 5. Marital status

Chapter 6. Conclusions and policy recommendations

CHAPTER 2: ASSESSMENT OF DATA QUALITY AND DATA ADJUSTMENTS

2.1 ASSESSMENT OF AGE HEAPING

The quality of data on the age-sex structure of the population is one of the most important indicators measuring general quality of Census data. The evaluation of data quality related to the age-sex structure as well as the completeness of population enumeration are based on demographic standards.

One type of common error found in responses about age in the population Census and in demographic surveys is age heaping, which occurs most often for the age ending with the digit zero (0) or five (5). A simple index to assess this kind of error is Whipple's index, which is calculated by comparing the number of people reporting their age ending with the digit zero or five and the estimated number of people in these ages, with the assumption that the population is distributed uniformly by age. Whipple's index ranges from 100 to 500. When the Whipple's index is 100, this indicates that no rounding has occurred for ages ending with zero or five. If all the respondents report their age ending with zero and five, Whipple's index would be 500.

The following standards are applied in evaluating quality of responses on age based on Whipple's index:

- Less than 105: very accurate
- 105 to 110: relatively accurate
- 110 to 125: fair
- 125 to 175: bad
- > 175: very bad

Figure 2.1: Values of Whipple's index by sex and year, Viet Nam, 1989-2009

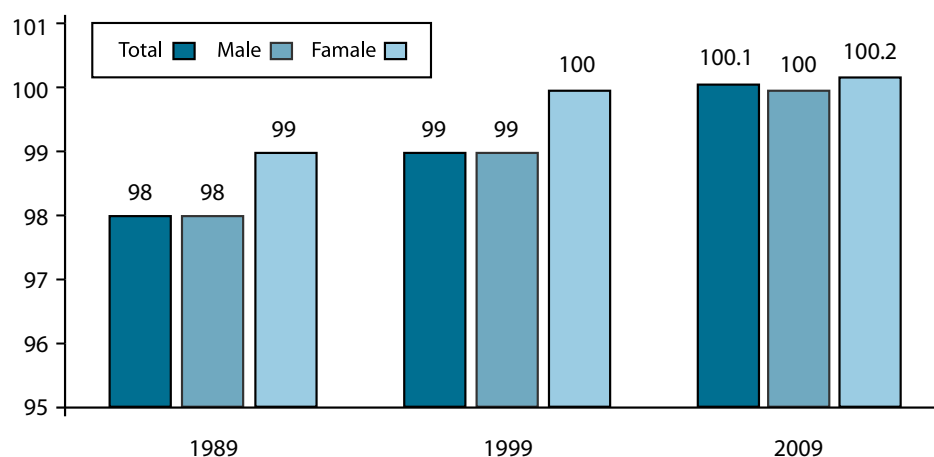


Figure 2.1 presents Whipple's index calculated from the Viet Nam population Censuses since 1989. The results indicate that almost no rounding to 0 or 5 is found in age data in the population Censuses in Viet Nam. According to the above standard, the responses on age in the population Censuses in Viet Nam from 1989 to 2009 can be regarded as "very accurate".

If the value of Whipple's index is less than 100, it indicates that there is a certain age (different from zero and five) that is preferred among the responses. Myer's blended index together with the UN age-sex accuracy index, and age-specific indicators also can show whether there is any other ending digit preferred by respondents in the population Census data. The value of Myer's blended index can range from zero to 90. The higher the value of Myer's index is, the more preference there is for certain digits (age heaping).

Table 2.1: Whipple's index, Myer's index and United Nations Age-sex accuracy index (UNI) for Viet Nam Census data, 1979-1999

	Whipple's Index	Myer's Index	UNI
1979	-	4.1	25.1
1989	98	3.5	20.9
1999	99	2.8	21.2
2009	101	2.9	22.3
2009:			
Male	100	3.1	-
Female	102	2.6	-
Northern Midlands and Moutains	100	3.1	20.7
Red River Delta	102	3.5	27.0
North and South Central Coast	101	4.6	25.7
Central Highlands	100	3.7	27.2
Southeast	100	2.4	31.2
Mekong River Delta	101	2.4	26.0

Note: Myer's index in 1979: Viet Nam Population Census in 1989, Aanalysis of the sample survey, General Statistics Office, Hanoi - 1991, p. 8 (the value was 4.3 for males and 3.8 for females in 1979).

Statistics in Table 2.1 indicate that the values of Myer's index in the population Census in Viet Nam is very low and has progressively improved. Myer's index reached the highest value in the population Census in 1979 at only 4.1. The Myer's index was reduced to 3.5 in the population Census in 1989 and to 2.8 in the Census in 1999. The Myer's index in the 2009 population Census was higher by only 0.1 compared to 1999, which is considered very small compared to the full range of this index which varies from 0 to 90. Both Whipple's and Myer's indexes confirm that age heaping at ages ending with 0 or 5 in the population Censuses in Viet Nam is insignificant.

Table 2.2 presents the values of Myer's index by the ending digits of age for the population Censuses in Viet Nam in 1989, 1999 and 2009. These values indicate whether any specific age is preferred in the responses. These age specific index values range from 0 to 10. In the numeric range from 0 to 9, if the value is 0, there is neither preference nor avoidance of any age ending with these numbers. If any value is higher than zero (positive sign), preference at the age ending with that number exists. If the value is less than zero (negative sign) there is an avoidance of age response at that number.

Data in Table 2.2 indicate that in the three Census of 1989, 1999, 2009, the ages that had the highest frequency were ages ending in 8, followed by ages ending in 6. The least frequent ages were those ending in 7, followed by those ending in 2. One of the reasons explaining why respondents often report their ages ending with 8 is because the population Census in Viet Nam is conducted in years ending with 9 and ages are determined by questions asking year in which the respondents were born. When asked for the year they were born, many of the respondents tend to report being born in the years ending with zero (1930, 1940, 1950), especially those who do not remember precisely when they were born or were born close to the years ending with these digits (e.g. years ending in 9 or 1). Since the Census takes place on April 1, when age is calculated, about three quarters of those who declared being born in the years ending with 0 will end up having their age ending with 8 and the remaining quarter will have their age ending with 9.

Table 2.2: Myer's index and digit preference in the Viet Nam population Census, 1989-2009

Ending digit	1989	1999	2009
0	-0.2	-0.1	-0.1
1	-0.2	-0.2	-0.3
2	-0.5	-0.3	-0.4
3	-0.1	-0.1	-0.1
4	0.2	0.2	0.1
5	-0.1	-0.1	0.1
6	0.3	0.5	0.5
7	-0.7	-0.7	-0.4
8	0.8	0.6	0.7
9	0.5	0.1	0.1
Overall	3.5	2.8	2.9

It is necessary to mention that the number of respondents having ages ending with number six is relatively high (ranked second after number 8). It is possible that the number of people having ages ending with number six is large (due to high number of births) not due to incorrect responses. Years ending with number three correspond to "Qui" years in the lunar calendar (i.e. 1943 corresponded to Quy Mui, 1953 corresponded to Quy Ty, and 1963 corresponded to Quy Mao, etc). It is traditionally believed that years start with Quy are good and lucky therefore parents prefer having children in these years. Although precise dates cannot be remembered, those who were born in these Quy years will tend to have ages ending with the number 6.

Despite the existence of the above mentioned phenomena, the age-specific Myer's index in 2009 yielded the highest value at 0.7 (within the possible range of 0 to 10). It can be concluded that age preference in responses to the population Census in Viet Nam are not a concern. In addition, all three Censuses in Viet Nam were conducted on the 1st of April in 1989, 1999 and 2009, if some people reported that they were born in the following years ending with 0, three fourths of these cases will not influence the analysis of age when it is grouped into age groups (0–4, 5–9, 10–14,...).

Another index using uniform distribution but only based on population distribution by sex and 5-year age groups is the Age-sex Accuracy index developed by the United Nations (UNI) . This index tells us how accurate the population structure by sex and 5-year age groups is. Standards for quality of sex and 5-year age group distribution with this index are:

- <20: Accurate
- 20 to 40: Inaccurate
- >40: Very inaccurate

In general the UNI is used in evaluating the quality of population distribution by sex and 5-year age groups before making population projections, in particular this index is used in considering whether any adjustments to population data are needed before making any population projections. Usually, when the UNI ranges from 20 to 40, population structure by sex and five-year age groups is considered incorrect. It is necessary to apply the index, yet not necessary to edit the data before making any population projections but caution is needed when using the data. If the UNI index is higher than 40, data editing is needed before making any projections.

Figures in Table 2.1 (Colum 3) are UNI for population structure by sex and 5-year age groups for Censuses from 1979 to 2009. Statistics in this table indicate that the values of UNI for four Censuses in Viet Nam were above 20 points with the lowest value being 20.9 for the Census in 1989 and the highest value of 25.1 points recorded in the Census conducted in 1979.

Thus, it can be said that the accuracy of combined sex and age indexes in the population Censuses following international classifications is not assessed as high. However, this inaccuracy is attributed to the consequences of the war. The UNI is developed based on the assumption that normal age and sex structures (i.e. the sex ratio gradually decreases from one age group to another and at the highest age group, the value of this index ranges from 95 to 100. Population size corresponding to 5-year age groups decreases as age increases and its value will be approximately equal to the mean value of the two five-year age groups immediate prior and after it. However, it is important to note that the population of Viet Nam has been strongly affected by war casualties. This is particularly true for the age groups over 50. As a result sex and age indexes experience abnormal changes for those age groups.

2.2 ASSESSMENT OF AGE HEAPING AT REGIONAL AND PROVINCIAL LEVELS

Table 2.1 presented Whipple's Index, Myer's Index and UNI for the 2009 population and housing Census in Viet Nam by region. Similar to the whole country, both Whipple's and Myer's indexes by region are very small reflecting high accuracy in responses on age by region. The values of Whipple's index are 100 in three out of the six regions, 101 in two regions and 102 in one region. Myer's index values range from 2.4 to 4.6 across the regions.

The UNI by region is much higher than at the national level with the exception of the Northern Midlands Mountains. Regions with the highest UNI include the Southeast, Central Highlands and the Red River Delta. Apart from the consequences of war affecting the UNI for the whole country, high values of UNI in upland areas particularly in the Southeast, Central Highlands and Red River Delta are also affected by migration. One typical feature of migration is age and sex selection (a majority of migrants are young people and males). This selection in migration significantly changes the normal sex and age structures of both destinations (Southeast and Central Highlands) and places of origin (Red River Delta). Migration therefore is the main reason UNI in the Southeast, Central Highlands and Red River Delta are higher than at the national level.

Figure 2.2: Provinces with lowest and highest Myer's Indices, Viet Nam, 2009

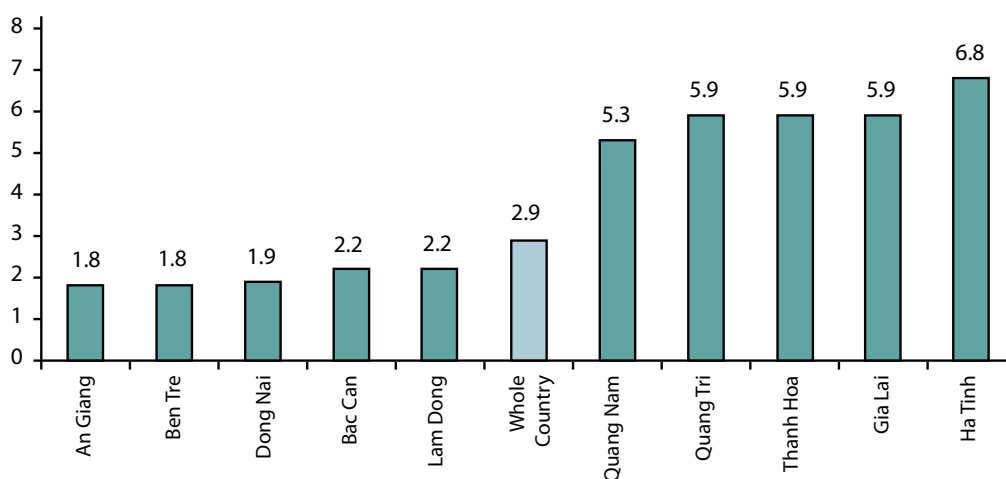


Figure 2.1 indicates that the differences in the value of Myer's index between the lowest value of 1.8 (An Giang province) and the highest value of 6.8 in Ha Tinh province is only five (5) points. This difference is relatively small compared to the possible range from zero to 90. Differences in value of the Myer's index among the five provinces with the highest values only range from 5.3 to 6.8. This small difference reflects high reliability in the quality of responses for age.

Figure 2.3: Five provinces with the lowest UNI values and five provinces with the highest UNI values, Viet Nam 2009

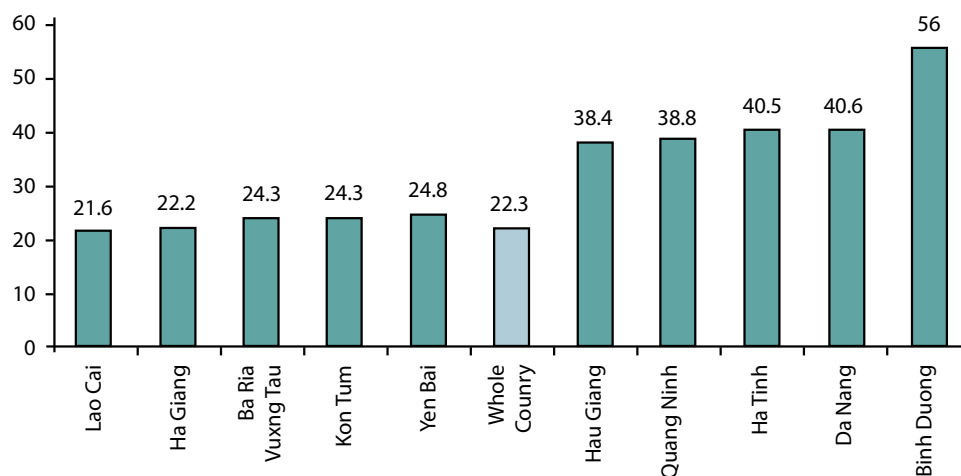


Figure 2.3 compares the value of UNI among five provinces with the lowest values and five provinces with the highest values. It can be concluded that migration has a strong impact on UNI at the provincial levels.

Data in Figure 2.3 and the appendix show that provinces with low UNI value have either small inter-provincial migration or the age structure of in-migrants is very similar to the population structure of the destination province. These are primarily the mountainous provinces including Lao Cai, Ha Giang, Kon Tum and Yen Bai. The UNI values in these provinces are the lowest in the nation.

In contrast, provinces with high values of UNI have high inter-provincial migration (either out-migration or in-migration). These provinces include Binh Duong and Da Nang with high in-migration and Ha Tinh, Quang Nam and Hau Giang with high out-migration. The high level of either out-migration or in-migration disturbs the ordinary sex and age structures of the population. Therefore, high UNI value in these provinces can be explained by the unusual sex and age structures of the population rather than discrepancies in age and sex reporting in the Census.

2.3 ASSESSING THE COMPLETENESS OF ENUMERATION OF CHILDREN AND THE ELDERLY

A post-enumeration survey was used as the method to validate the quality of data collected in the Census. After the 2009 population and housing Census was completed, the Central Steering Committee of the Census randomly selected 60 enumeration areas for a post-enumeration survey. Results of the post-enumeration survey indicated that at the national level there was a 1.8 percent duplication rate and 1.5 percent undercount rate and the net coverage error (undercount rate minus duplication rate) was negative 0.3 percent (CPHCSC, 2009). This is considered a relatively small coverage error.

In a population Census, it is important to have an accurate figure of not only the total population but also the number of people in certain age groups such as the number of children from 0–4 years of age and the elderly population.

2.3.1 Assessing the completeness of enumeration of children 0–4 years of age

In order to check the accuracy of the data regarding number of children in the Census, the number of children enumerated in certain age groups is compared with the “estimated” number of children generated from the fertility rate and mortality rate corresponding to those age groups. It is understood that children age zero are those born in the 12 months prior to and still alive at the time of the Census. The number of children born in a certain period of time (12 months) is identified by using the crude birth rate and the average population of that particular period. The number of children alive is calculated by multiplying number of children born times the survival ratio from delivery to the time of the Census.

Table 2.3: Comparison of child population (age 0, ages 1–4, ages 0–4) recorded in the Census and the estimated child population during 5 years prior to the Census

Age	Estimated population			Enumerated population			% difference		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0	770 721	703 753	1 474 474	806 773	716 348	1 523 121	4.7	1.8	3.3
1–4	2 929 247	2 703 064	5 632 311	3 031 315	2 724 217	5 755 532	3.5	0.8	2.2
0–4	3 699 968	3 406 816	7 106 784	3 838 088	3 440 565	7 278 653	3.7	1.0	2.4

Table 2.3 presents the number of children under 5 years of age in the enumerated in the population and housing Census as of April 1, 2009 in comparison with the estimate of the number of children less than 5 years of age estimated using the crude birth rate (CBR) in the 5 years prior to the Census. The difference between the actual number enumerated in the population Census as of April 1, 2009 and the estimate of the population aged 0–4 is acceptable (only 2.4 percent). The difference for females aged 1–4 years is only 0.8 percent. The differences in the age group zero is higher than in the age group from 1–4 years of age (3.3 percent versus 2.2 percent respectively). The differences among male children is higher than among female children. The difference is nearly three times for the age group zero (4.7 percent versus 1.8 percent) and nearly four times for the age group 1–4 year (3.5 percent versus 0.8 percent).

2.3.2 Assessing the completeness in enumeration of the elderly

In the Censuses, the total number of the elderly enumerated tends to be incorrect since the elderly population does not usually remember their age exactly. In addition, older people tend to report higher ages to gain more respect. One of the popular methods applied in assessing the quality of data on the aged population is to compare the figure collected in the Census for the age group of over 60 with the “projected” number of people in the same age group using complete results of the previous population Census.

Table 2.4 presents the differences in the population aged 60 and over between the data enumerated in the 2009 population Census as of April 1, 2009 and the projected figure for the population over 60 years of age using the complete data of the previous population Census as of April 1st, 1999. Projected population is calculated on the basis of population by sex and by 5-year age groups applied to the 1999 Population and Housing Census (for the age group of 50-54 and older) and the survival ratio by sex and 5-year age groups calculated from the life table in 1999 (66.5 years old for male and 70.1 for female).

Table 2.4: Population aged 60 and older enumerated in the 2009 Census compared with population projected from the 1999 Census

Age group	Projection from 1999 Census			Data from 2009 Census			% difference		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
60–64	863 218	1 055 253	1 918 472	901 535	1 094 054	1 995 589	4.3	3.5	3.9
65–69	658 078	886 833	1 544 912	688 461	916 624	1 605 085	4.4	3.3	3.7
70–74	576 583	799 072	1 375 655	601 320	863 548	1 464 868	4.1	7.5	6.1
75+	810 224	1 242 252	2 052 475	981 292	1 653 718	2 635 010	17.4	24.9	22.1
Total	2 908 103	3 983 410	6 891 514	3 172 608	4 527 944	7 700 552	8.3	12.0	10.5

Data indicate that the difference between the population aged 60 and over collected in the Population and using Census as of April 1, 2009 and the projected population is relatively large at 10.5 percent. This high percentage difference is attributed largely to the difference in the age group 75 and over (22.1%). Meanwhile the differences in other age groups only range from 3.7% to 6.1%. It is important to note that the differences for males is higher than for females for the age groups 60–64 and 65–69. However, the reverse trend is seen among the age group 70–74. In contrast to the situation for the age group from 0–4, the difference among females in the age group 60 and over is higher than among males. That the differences between the actual figures and the projected figure increases by age indicates that the higher the age group, the less accurate the data.

2.4 CONCLUSIONS

The evaluation of the data in this chapter indicates that, in general, the quality of the sample data from the Census 2009 satisfied basic requirements for the purposes of analysis in this monograph. There is some evidence about problems of heaping on certain years of birth, underreporting of the number of children under age 5, and over reporting of age among the elderly. However, these limitations are not serious enough to have significant impacts on the analysis. Thus no adjustments were necessary for estimates made in this monograph

CHAPTER 3: AGE-SEX STRUCTURE OF THE POPULATION IN VIET NAM

3.1 AGE-SEX STRUCTURE

3.1.1 Changes in the age-sex structure of the population in Viet Nam from 1979 to 2009

Similar to many developing countries in Southeast Asia, Viet Nam is in the post-demographic transition, in which the transition from high fertility and mortality to low fertility and mortality has already occurred and the age-sex structure of the population has undergone major changes.

Table 3.1 presents the age structure for males and females in Viet Nam in 2009. The data show that, because of the declining fertility rate, the proportion in the 10–14 year-old population for both sexes is smaller than the 15–19 year old cohort and larger than the 5–9 year old cohort. However, the age group 0–4 shows a slight increase in size. The reason for this is that recently only modest decreases in fertility have occurred, while the number of women in childbearing age has increased considerably (as the consequence of high fertility 20–30 years ago), leading to the absolute total number of births (2004–2009) not decreasing, but actually increasing compared with the previous five years (1999–2004).

Table 3.1: Age structure of the population in Viet Nam by sex, 2009

Age	Male	Female	Total
0–4	8.6	7.8	8.2
5–9	8.2	7.5	7.8
10–14	8.8	8.1	8.4
15–19	10.8	10.1	10.4
20–24	10.0	9.6	9.8
25–29	9.2	8.9	9.1
30–34	8.2	7.8	8.0
35–39	7.8	7.4	7.6
40–44	7.0	6.9	7.0
45–49	6.2	6.5	6.3
50–54	4.9	5.4	5.1
55–59	3.2	3.7	3.5
60–64	2.0	2.5	2.3
65–69	1.5	2.1	1.8
70–74	1.3	1.9	1.6
75–79	1.1	1.7	1.4
80–84	0.6	1.1	0.8
85+	0.4	1.0	0.7
Total	100.0	100.0	100.0

Though the proportion of children aged 0–4 is slightly larger than the proportion of the 5–9 group (8.2% versus 7.8%), it can be seen that the proportion of children aged 0–4 decreases dramatically over time. Data in Table 3.2 show that, at the time of the 1979 Census, the children aged 0–4 accounted for 14.6% of the total population, and in the 1999 Census, the proportion was down to 9.4%, which means 5 percentage points lower than 20 years before. The proportion of the population aged 0–4 continued to decrease to 8.2% in 2009.

Table 3.2: Changes in age structure accounted for by children in Viet Nam, 1979–1999

	1979	1989	1999	2009
Number of children (persons)				
0–4	7 712 696	9 084 202	7 172 242	7 034 144
5–9	7 690 318	8 606 693	9 033 162	6 710 737
10–14	7 039 329	7 531 703	9 066 562	7 248 378
Proportion of total population (%)				
0–4	14.6	14.1	9.4	8.2
5–9	14.6	13.4	11.8	7.8
10–14	13.3	11.7	11.9	8.4

Among the child age groups, the proportion in the age group 5–9 years decreased most quickly, especially in the past 10 years. The proportion of the population aged 5–9 decreases from 11.8% in 1999 to 7.8% in 2009. The main reason is the dramatic fall in fertility in the period 1999–2004.

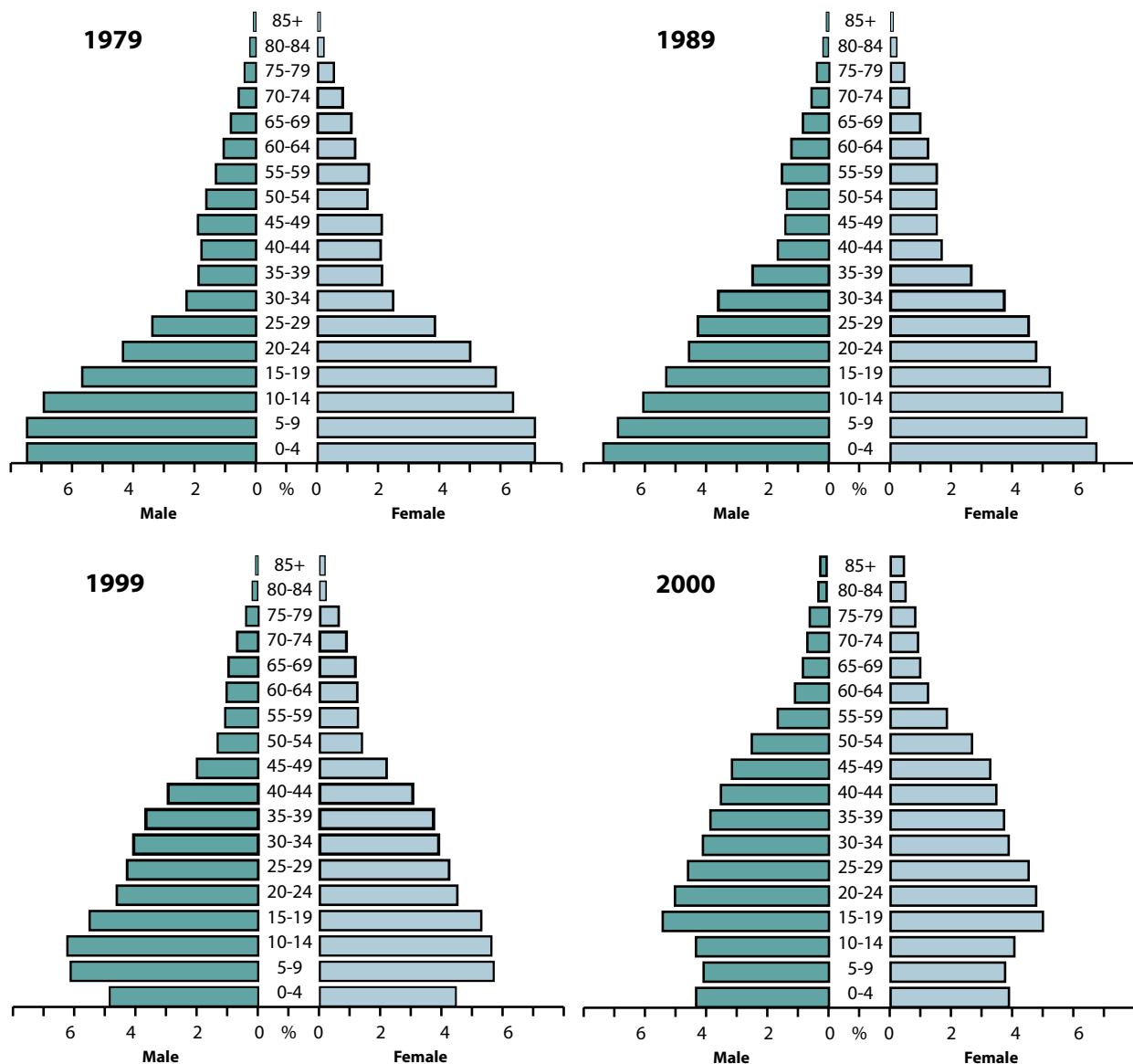
Figure 3.1 presents the age pyramids of population in Viet Nam across four Censuses from 1979 to 2009. The pyramids show that the age structure of Viet Nam’s population has changed considerably in the past three decades. Fertility started falling in the 1960s but was still at a high level until 1979. In the early period of the demographic transition in Viet Nam, the age pyramid was largest at the base and the width of bands fell quickly across age groups, while in the later period of transition (since 1999), the pyramid base has become narrower and is no longer the largest band.

The age pyramid of population in Viet Nam in 1979 is typical of populations with high fertility and mortality. Because fertility in the five years before the Census that took place on 1/10/79 had declined very little, and because of the population boom after a long period of war, the total population aged 0–4 was equal to the population aged 5–9. The groups aged 30–34, 35–39, and 40–44 years in 1979 were considerably smaller than the adjacent age groups as a consequence of the long period of war that ended several year before.

After a decade, in 1989, the age structure of the population in Viet Nam reflected mortality was higher than fertility. The characteristics of this pyramid are a large body and slightly narrowed base. Despite the fact that a family planning program was carried out nationally and the total fertility rate had fallen, because the number of women in reproductive ages had increased dramatically, the number of births increase and children aged 0–4 were more numerous than the cohort aged 5–9.

The age pyramid in 1999 is characteristic of the demographic transition with rapid declines in both fertility and mortality. The base of the pyramid (which represents the 0–4 cohort) had narrowed substantially, which illustrates a very rapid decrease in fertility in the five years before the Census. The pyramid body narrows slowly because of the strong decline in mortality and increases in life expectancy. The consequences of war are weaker and only significant for the 50–54 year old and older cohorts.

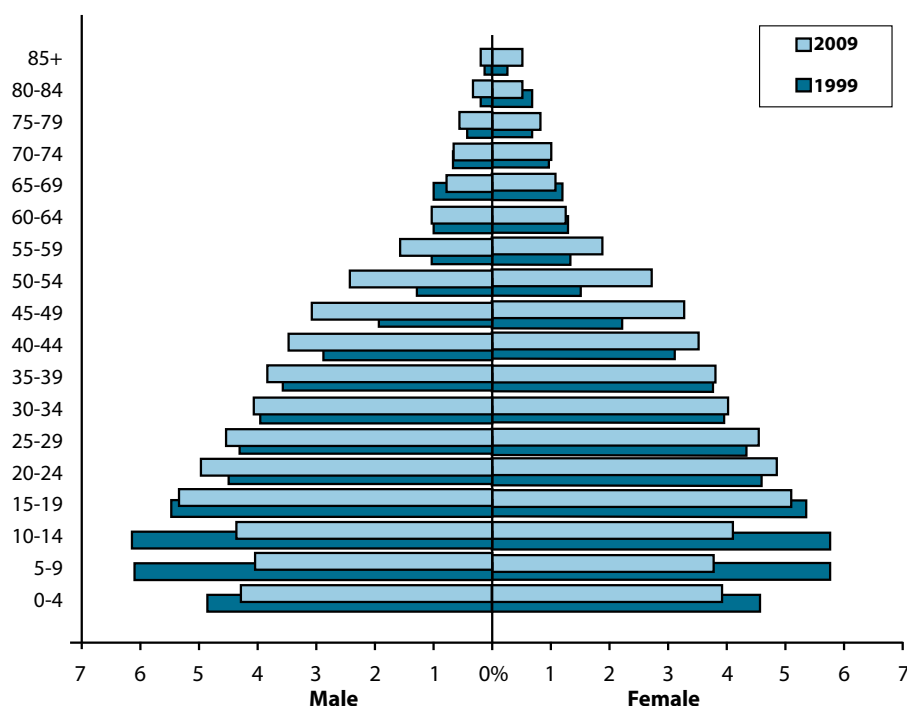
Figure 3.1: Age pyramid of the population in Viet Nam, 1979, 1989, 1999, and 2009



In 2009, the age pyramid is characteristic of the post demographic transition with low fertility and mortality and the beginning signs of an aging population. Fertility had fallen considerably in the 15 years before the Census, narrowing the three bands at the bottom. Mortality also declined and life expectancy increased. Thus, the pyramid body is narrowing towards the base. The war consequences impact on the pyramid are no longer clear, and can only be seen among the age groups from 60–64 and older.

Changes in population structures between 1999 and 2009 can be seen easily in a comparison of the two corresponding population pyramids in Figure 3.2. Compared with 1999, the proportion of population in the age groups below 20, especially the cohorts aged 5–9 and 10–14 years of age in 2009 show an obvious decline. Meanwhile, the proportions of the 20–24 and older cohorts, except for the 65–69 cohorts, have increased, with the largest increases seen in the age groups 45–49 and 50–54 cohorts. Thus, after ten years, the decrease in the proportion in child age groups and the increase in the proportion in adult ages have remarkably changed the dependency ratio and aging index in Viet Nam. These indicators will be analyzed in more detail in the following sections.

Figure 3.2: Comparison of population pyramids of Viet Nam, 1999 and 2009



3.1.2 Age-sex structure by urban/rural residence and by region

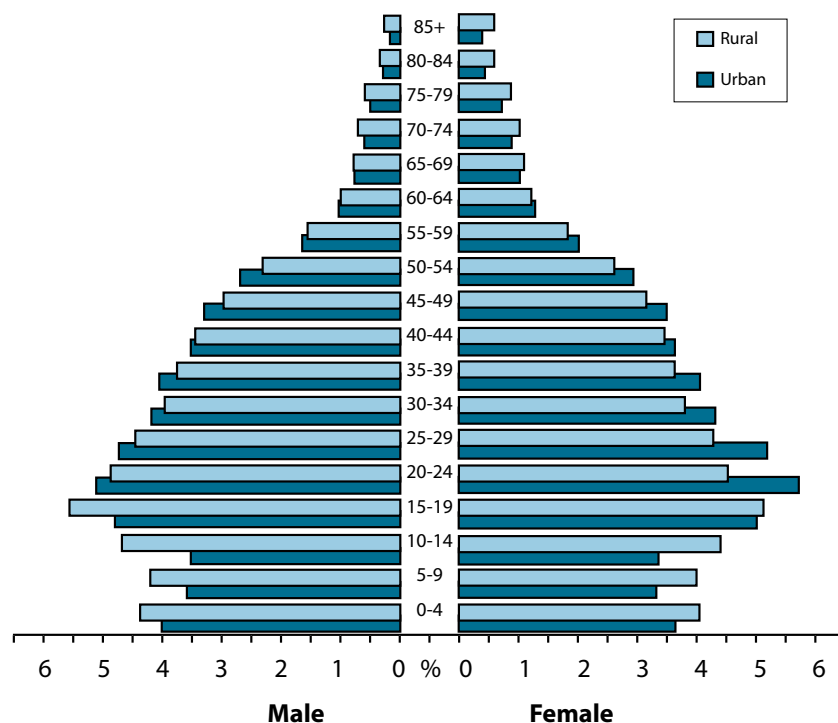
Age structure of the population depends on fertility, mortality and migration. Because international migration to and from Viet Nam is low, the age structure of the population mainly depends on fertility and mortality². However, migration significantly affects the age-sex structure of population in rural and urban areas, regions, and certain provinces. Since the economy has been transformed from a

² Viet Nameese who have gone abroad for study, work, medical care or tourism and are still abroad at the time of the Census are not considered as emigrants and are enumerated in the household (Central Census Steering Committee, 2008)

centrally planned economy to a market economy, domestic migration has changed dramatically with an increasing scale. Compared with the period from 1994–1999, the number of migrants in the five-year period from April 2004 to March 2009 increased almost 2.2 million (CPHCSC & NOTU 2010). All kinds of migration in Viet Nam, including inter-communal migration, inter-district migration, inter-provincial migration, and inter-regional migration, are occurring at a large scale and have shown strong increases. In general, the further the migration distance, the larger the number of migrants. During 2004–2009, total inter-communal migration increase by 275, 000 people compared with the period from 1994–1999, inter-district migration increased by 571, 000 people, inter-provincial migration increased by almost 1.4 million people and inter-regional migration increased by more than 1 million people (CPHCSC, 2010).

Figure 3.3 provides a comparison of population age-sex structure between urban and rural areas in Viet Nam in 2009. Since the rural population accounts for 70% of the total population, the rural age pyramid is similar to the national population pyramid. The urban population pyramid also indicates the tendency of decreasing fertility and mortality as seen in the total population. However, mainly because of differences in fertility, the base of the age-sex pyramid for the urban population is much narrower than for the rural population. The urban population pyramid is also significantly influenced by rural to urban migration. Because the rural-urban migrants are mainly in working ages, the proportions of the population in working-age groups, especially females, in urban areas are higher than in rural areas. Compared to the group aged 15–19, the proportions of the population aged 20–24 in urban areas does not narrow as in the total population, but expands. In fact, the pyramid is widest at the cohort aged 20–24 for the urban population, but at the cohort aged 15–19 for the rural population. In contrast, possibly because the proportion of middle-age and old-age (retired) people among urban-rural migrants is relatively large, the band for the age group 55–59 years in urban areas declined faster than in rural areas.

Figure 3.3: Comparison of rural and urban population pyramids, Viet Nam 2009

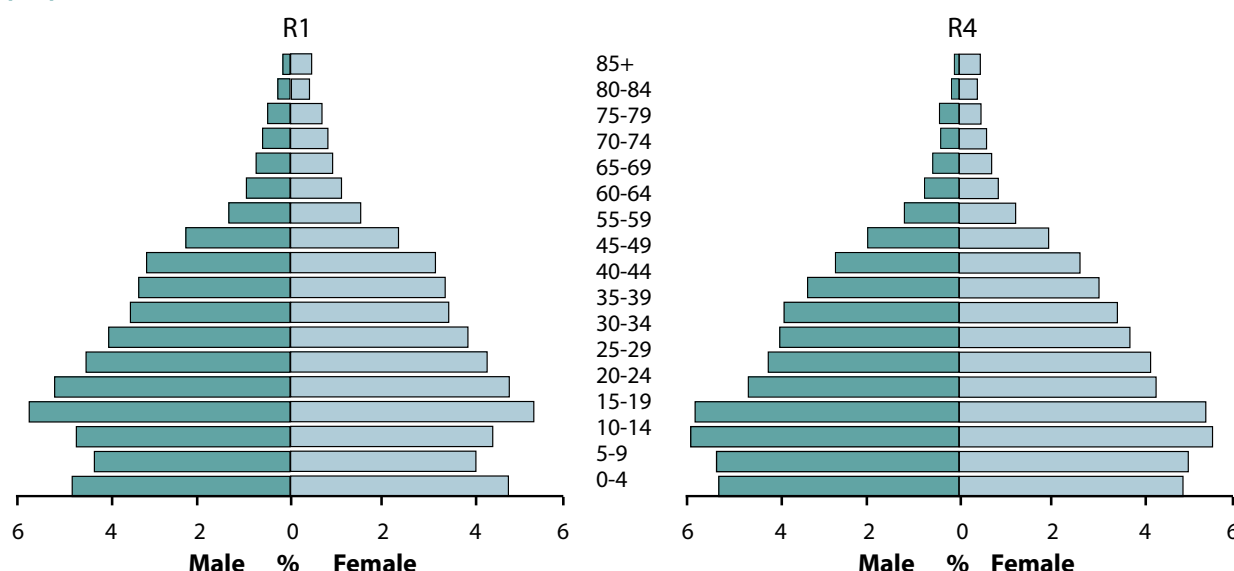


Since fertility, mortality and migration vary dramatically across regions, population age-sex structures also vary. However, in order to analyze the age-sex structures of population by region, it makes sense to compare age pyramids across regions in three pairs as follows.

Type 1: Northern Midlands Mountains (R1) and Central Highlands (R4)

These two regions have the highest fertility and mortality, which have nevertheless shown dramatic declines in recent years. The Northern Midlands Mountains is an out-migration region while the Central Highlands receives substantial in-migration. However, net migration rates are not high and the gap is not too high (-17.5 ‰ in R1 and 11.2‰ in R4).

Figure 3.4: Age pyramid of the Northern Midlands Mountains (R1) and the Central Highlands (R4)



These two regions have population pyramids characteristic of young populations with relatively wide bases and a sharp peak. It can be seen that the population of the Central Highlands is much younger than the Northern Midlands Mountains. The three bands at the bottom of the pyramid (0–4, 5–9 and 10–14 cohorts respectively) of the Northern Midlands Mountains are considerably narrower than the adjacent band (15–19 cohort). The main reason is that fertility in the 15 years before the Census has declined rapidly. Regarding the population pyramid of the Central Highlands, only the two bottom bands (which are equivalent to the 0–4 and 5–9 cohorts) are slightly narrower than the next band (the 10–14 cohort). This is because fertility in the Central Highlands has only decreased over the past ten years and only at a medium pace. The top of the Population pyramid for the Central Highlands narrows more sharply than for the Northern Midlands Mountains, indicating higher mortality in the Central Highlands.

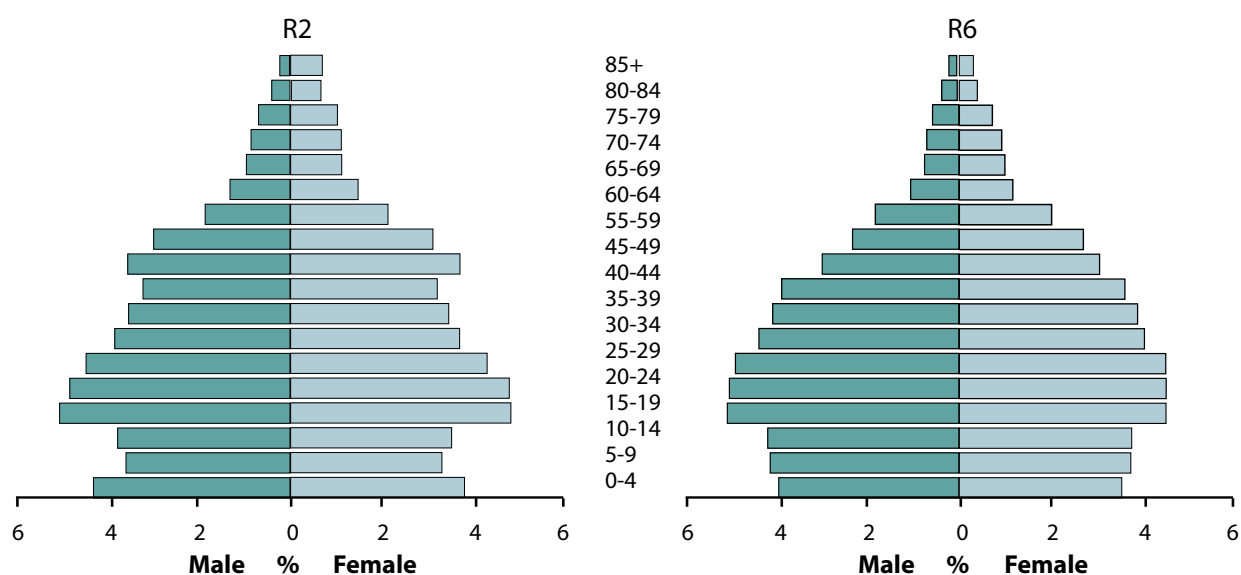
Perhaps mostly as a result of migration, the population pyramid of the Central Highlands narrows sharply in the 15–19 cohort to the 20–24 cohort, especially for males. The population aged 20–24 sharply declines as young people are migrating to other regions for studying (at vocational schools) while middle-age people are migrating into this region to work in agriculture, forestry and construction. Among the six regions, the Central Highlands has the highest proportion of the population aged 10–14 years.

Type 2: Red River Delta (R2) and Mekong River Delta (R6)

Both the Red River and Mekong River Delta regions have low mortality and fertility rates and negative net migration, but the net-migration rate is relatively high in the Mekong River Delta (-40.4 ‰) and small in the Red River Delta (-1.7 ‰).

The age-sex pyramid of the Mekong River Delta is relatively smooth and its base and body narrow steadily. The size of the three bands at the pyramid base vary only slightly, indicating that fertility in the Mekong River Delta has not declined strongly in the past 15 years.

Figure 3.5: Age pyramids of the Red River Delta (R2) and Mekong River Delta (R6), 2009



In contrast, the age-sex pyramid of the population in the Red River Delta is not so smooth. Since fertility declined dramatically in the period 1994–2004, the size of the two bands of the two respective birth cohorts narrows remarkably. In addition, the total population in the main reproductive ages (25–30 years) in the period 1994–2004 (about the age from 30 to 40 in 2009) declined, which contributed to the decline in total births. Similarly, the fact that the cohort of children 0–4 years is notably larger than the 5–9 year old cohort corresponds to the abrupt increase in the size of the 20–29 year old cohort compared to the 30–39 year old cohort, despite continued declines or at least stability in fertility in the Red River Delta in the period 2000–2009.

Though the net migration rate from the Red River Delta is not high, -2.3‰, both out-migration and in-migration are not insubstantial (16.0‰ and 18.5‰, respectively (CPHCSC, 2009)). Migration appears to be a strong factor affecting the age structure of population in this region, making the age pyramid body strongly narrow among the cohorts aged 30–34, 35–39 and 40–44 years, and expand among the older cohorts, especially the cohorts aged 45–49 and 50–54 years for both sexes.

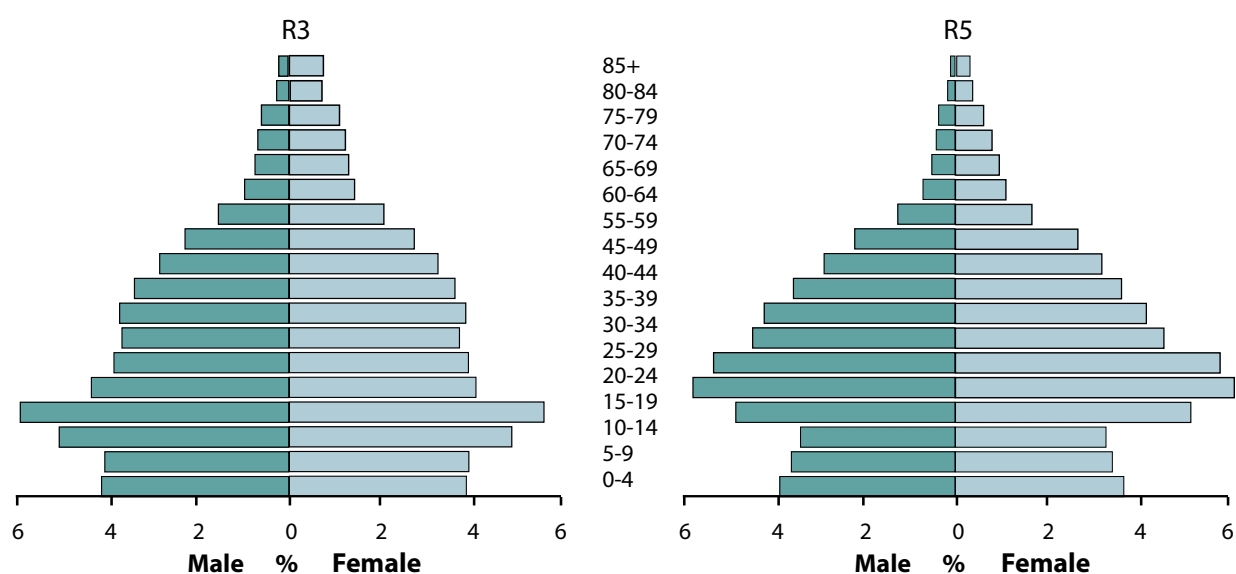
Type 3: The North and South Central Coast (R3) and the Southeast (R5)

The population age-sex structures of these two regions are particular and contradict each other. In both of these regions, crude birth rates are low, only exceeding that in the Mekong River Delta. Migration flows are also distinctive. The Southeast is the destination for most out-migrants from

the North and South Central Coast. According to Census data, among 775, 000 people migrating from the North and South Central Coast in the five years before the Census, 570, 000 people (74%) migrated to the Southeast (CPHSSC, 2010).

The age pyramid of the North and South Central Coast (R3) has a rapidly narrowing base, especially at the cohorts aged 10–14 and 5–9 years. Because fertility in the period April 2004 to –March 2009 slightly declined in compared with the previous five years, the two bottom bands of the pyramid have a similar size. The age structure of the North and South Central Coast suddenly narrows at the 20–24 year old cohort and the next five adjacent cohorts are almost equal. It is likely that this is due primarily to migration as this is the region with the second highest out-migration (ranked second to the Mekong River Delta)

Figure 3.6: Age pyramid of the North and South Central Coast (R3) and Southeast (R5), 2009



The age pyramid of population in the Southeast is most distinctive. This is the only region with an age pyramid that has the two bottom bands wider than the adjacent one (the 5–9 cohort is wider than the 10–14 cohort and the 0–4 cohort is larger than the 5–9 cohort) because of the steady increase in the number of births in the 10 years before the Census. However, this does not mean increasing fertility rates but rather an increase in the number of people in reproductive age groups. Because of rapidly declining fertility in the 1990s and partly because of migration, the bands for the population aged 10–14 is considerably narrower than the band for the 20–24 year age group. This is the region with the highest proportion of the population in the 20–24 year old group. From the 20–24 band through the 60–64 band, the pyramid narrows swiftly and steadily, suggesting a high fertility rate before the period 1985–1989. The population pyramid for the Southeast continues to narrow in the old-age groups but not as rapidly as in the younger age groups.

3.1.3 Age-sex structure differences by province

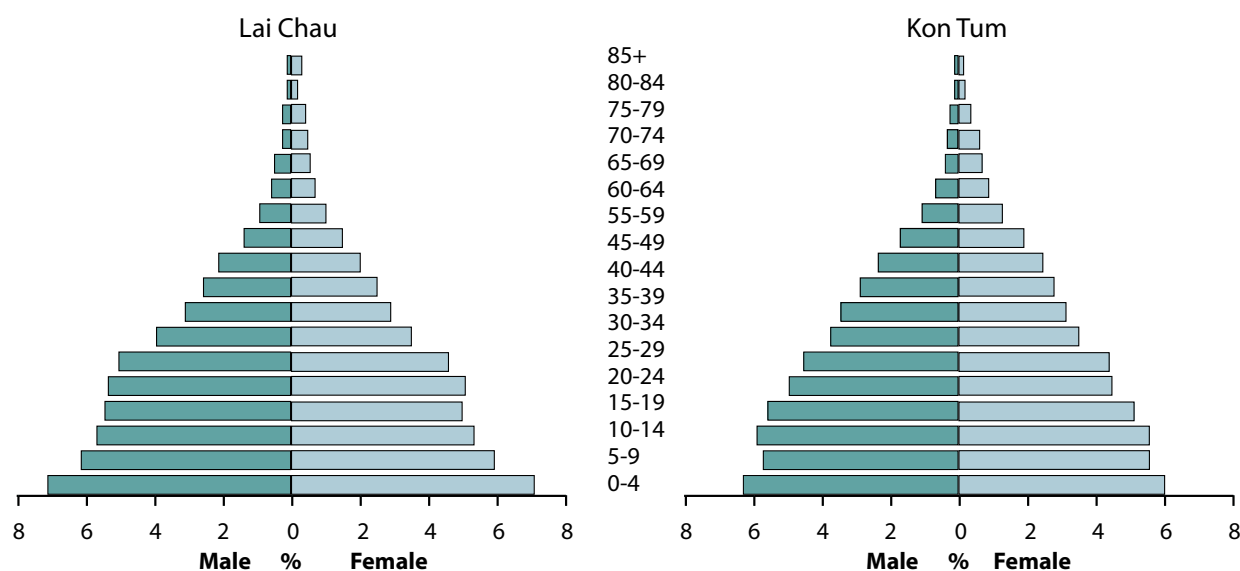
Similar to the variation within regions, the differences in fertility, mortality and migration also lead to differences in population pyramids across provinces. The population structure of provinces in Viet Nam in 2009 can be classified in to the following three typical groups:

a) Provinces with high fertility and mortality rates but relative low net-migration rates.

This group includes mostly mountainous provinces such as Lai Chau, Dien Bien, and Ha Giang in the North and Kon Tum and Gia Lai in the South. The age pyramids of these provinces are typical of young populations.

Figure 3.7 presents age pyramids of the population in Lai Chau and Kon Tum, two typical provinces in this group. For the period of 12 months before the Census, the TFR of Lai Chau was 2.96 and the CBR was 26.2‰, which ranked third among all provinces and only lower than Kon Tum and Ha Giang. In Lai Chau, the IMR in 2006³ was 36‰,⁴ which is quite high in comparison to the IMR of Viet Nam (16‰). The net migration rate in Lai Chau five years before the 2009 Census was 33.6‰ and there were moderate rates of out-migration and in-migration (48.8‰ and 13.5‰). Kon Tum is among the provinces with the highest fertility and mortality (TFR is 3.45 and IMR in 2006 was 52‰). The net-migration rate is 26.9‰ with the out-migration and in-migration rates similar to Lai Chau province, at 46.4‰ and 19.5‰ respectively. Like in most populations with high fertility and mortality, the age pyramids of the population in Lai Chau and Kon Tum have a triangular shape, widest at the base and narrowing swiftly across age groups.

Figure 3.7: Age pyramids of the population in Lai Chau and Kon Tum, 2009



b) Provinces with fertility and mortality rates around the national levels and high negative net migration rates. Most provinces in the Red River and Mekong River Deltas and many provinces the North and South Central Coast belong to this group.

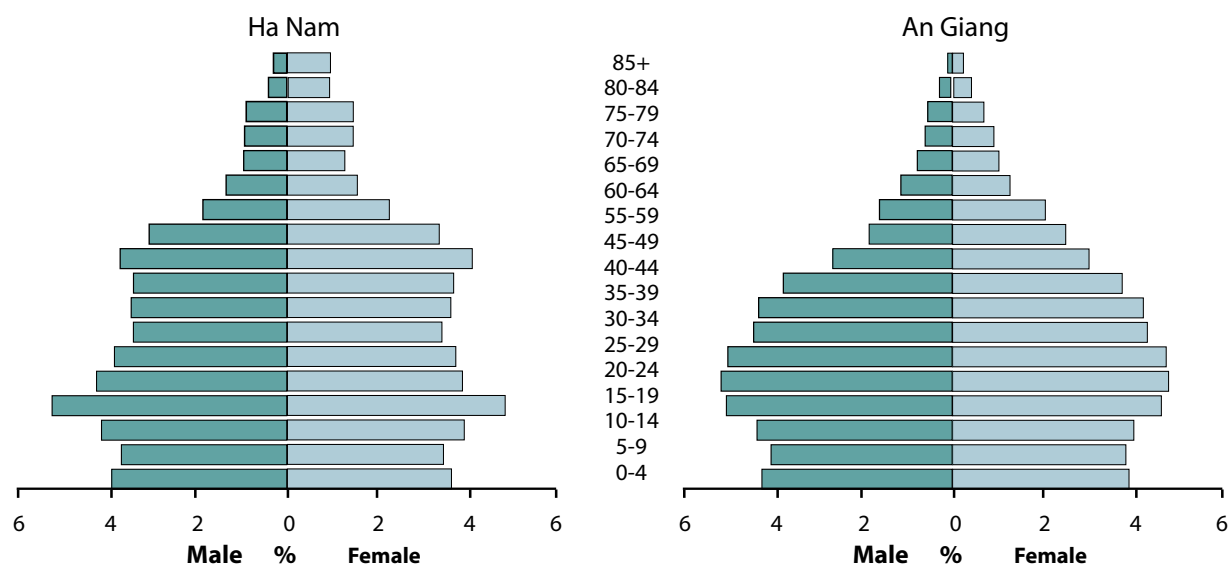
³ 2006 is the latest year with provincial data on IMR

⁴ General Statistics Office. Survey of Population Change and Labor Force and Family Planning. 2006. Main Findings. Hanoi:Statistical Publishing House, 6-2007, page 68, Table 5.3

Figure 3.8 presents the population pyramids of Ha Nam (Red River Delta) and An Giang (Mekong River Delta). In Ha Nam province, TFR is 2.07 and CBR is 14.9 ‰ which are similar to the national averages, IMR in 2006 was 13.0 ‰, which is lower than the national average (16.0‰). Ha Nam reported a net migration rate in the five years before the Census at -53.5‰, with the in-migration rate of 12.1‰ and out-migration rate of 65.6‰. An Giang reports fertility, mortality and migration rates similar to Ha Nam province (TFR=1.97, IMR in 2006=19‰), the net migration rate of -5.9‰, with an in-migration rate of 9.2‰ and an out-migration rate of 55.1‰.

Figure 3.8 indicates that the base of the age pyramid (age groups below the 15–19 year old cohort) is similar between the two provinces with fertility declining rapidly for the period 1994 to 2004, then increasing slightly for the period 2005–2009. However, the two population pyramids are very different in their bodies. For the Ha Nam population, the band for the age group 20–24 narrows abruptly and remains constant until the age group 40–44 (i.e. five adjacent cohorts). Similar to the situation in the Red River Delta, out-migrants from Ha Nam are either students or workers and a majority of them are young, while the in-migrants are mostly returning migrants in middle and older ages. Therefore, the populations in every five-year age group from 20–24 to 40–44 are lower than the population aged 15–19 years and the population aged 45–49 years.

Figure 3.8: Age pyramids of the population in Ha Nam and An Giang provinces, 2009



In contrast, the age pyramid for An Giang is widest in the body and narrows steadily. This result may be because the age structure of net migrants in An Giang is similar to that of the provincial population in general. The top of the age pyramid of An Giang is also narrower than in Ha Nam province.

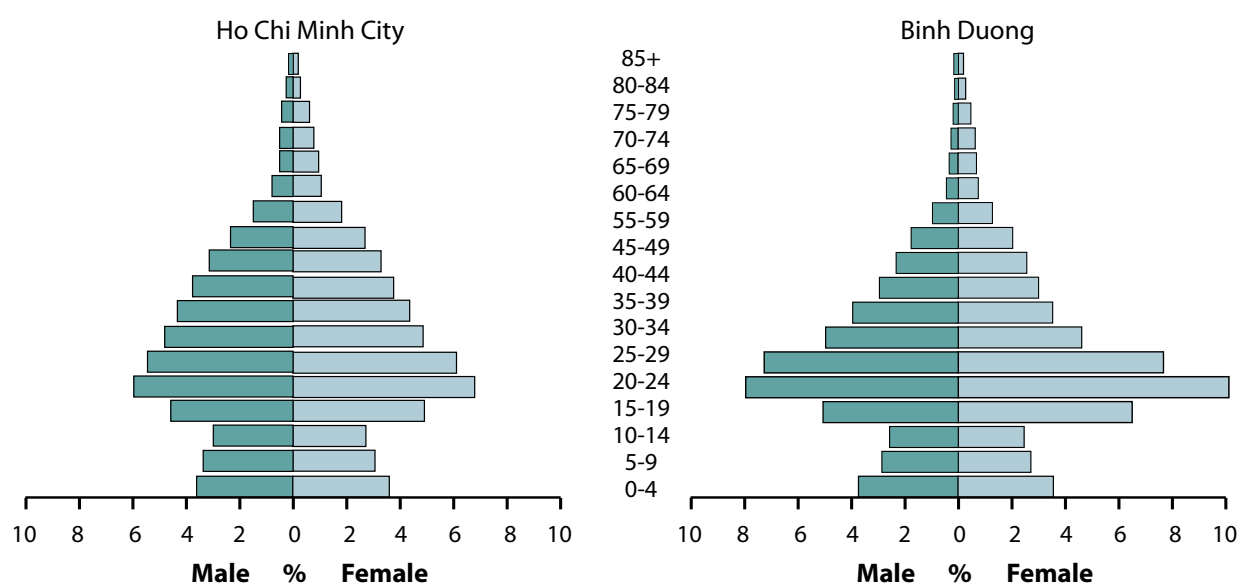
c) Provinces with low fertility and mortality rates, and high positive net-migration. Ho Chi Minh City and Binh Duong are two typical provinces in this group.

In Ho Chi Minh City, the TFR in the 12 months before the 2009 Census was 1.45; CBR was 15.3‰, and the IMR in 2006 was 10‰, which are much lower than the corresponding national rates. Ho Chi Minh City had a net migration rate for the five years before the Census at 135.7‰ and the in-migration and out-migration rates respectively at 156.4‰ and 20.8‰.

In Binh Duong, the fertility and mortality rates are higher than in Ho Chi Minh city (respectively TFR=1.7 and IMR in 2006 =11‰). However, the net migration rate of Binh Duong is 340.4 ‰, 2.5 times higher than in Ho Chi Minh City and ranks the highest in Viet Nam. The in-migration and out-migration rates are respectively 365.9‰ and 24.1‰.

The age pyramids of the populations in Ho Chi Minh City and Binh Duong have very narrow bases, especially Binh Duong province. This reflects not only low fertility but also migration. In both provinces, the in-migration rates are large and most in-migrants are between 20 and 50. Consequently, the proportion of population in the under-20 age groups is relatively small. Similarly, the tops of the population pyramids in Ho Chi Minh City and Binh Duong are quite sharp, which does not mean low life expectancy but the effect of a large number of young in-migrants leading to lower proportions in the old-age groups. In contrast to other provinces, both Ho Chi Minh City and Binh Duong have the highest proportions of population in the age group 20–24.

Figure 3.9: Age pyramids of the population in Ho Chi Minh City and Binh Duong in 2009



Nevertheless, there are several differences in the age pyramids between the two provinces. The age pyramid of Ho Chi Minh City indicates that, bands of the population in the older age groups starting from the 25–29 year old cohort narrow at slower pace. Since people may move to Ho Chi Minh City with many different reasons, such as studying, working, business, retirement and marriage, the age distribution of in-migrants is quite varied, whereas, most people moving to Binh Duong to find jobs at industrial and manufacturing zones are young. As a result, the migrants moving to Binh Duong are mainly in the ages between 20 and 29, leading to large increases in the proportion accounted for by these age groups. Some work in Binh Duong for several years to accumulate savings, and then move back to their origin locations for marriage or family reunification. These return migrants contribute greatly to the decrease in the population aged 30–34, especially for females.

3.2 DEPENDENCY RATIO AND AGING INDEX

When discussing the impact of population on socioeconomic development, the burden of non-working people (dependent people) on working people is often mentioned. In demography, the dependency ratio is used to measure this burden. There are three types of dependency ratios: (i) child dependency ratio, (ii) aged dependency ratio and (iii) total dependency ratio.

The child dependency ratio is measured as the ratio between the population below working ages (below 15 years of age) and the working-age population (from 15 to 64 years of age) multiplied by 100 to measure in percentage terms. The child dependency ratio indicates the number of child dependents that need to be supported for every 100 people in working ages,

The aged dependency ratio is measured as the ratio between the population beyond working ages (above 64 years of age) and the working age population multiplied by 100 to measure in percentage terms. The aged dependency ratio indicates the number of elderly that need to be supported for every 100 people in working ages.

The total dependency ratio is measured as the ratio of the dependent population ((below age 15 and above age 64) and the working age population (15-64) multiplied by 100 to measure in percentage terms. The total dependency ratio indicates how many dependent people need to be supported by every 100 people in working ages. Thus, the higher the dependency ratio is, the heavier the burden for the working population and vice versa.

The demographic transition also leads to an increase in the average age of the population. This phenomenon is called population aging and is measured using the aging index.

The aging index is measured by dividing population aged 65 years and older by the number of children aged 0–14 years and multiplying by 100. The aging index indicates how many people aged 65 years and older there are for every 100 children aged 0–14. While the total dependency ratio is based on the whole age structure of the population, the aging index depends only on the aged population and child population.

In Viet Nam, because official working ages according to regulations are from 15 to 59 years of age, the dependency ratio and the aging index in Viet Nam are measured using age 15-59 for working ages and age 60 and older for the group past working age. Thus, the dependency ratios and aging index in Viet Nam can be measured based on the population aged 15-59 or 15-64 or both for comparison purposes.

3.2.1 Dependency ratio and aging index in Viet Nam

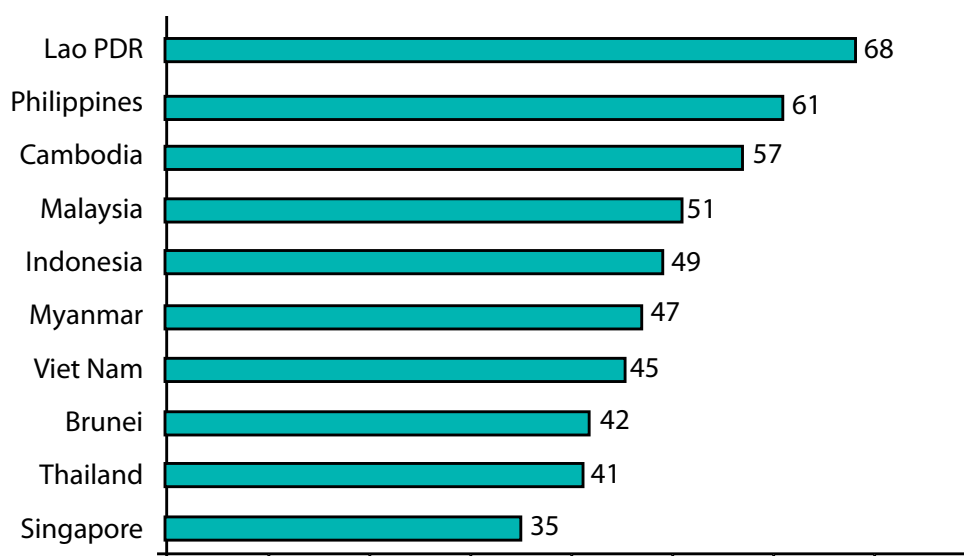
Table 3.3 shows that, the proportion of the population aged 0–14 has decreased remarkably, from 43% in 1979 to 39% in 1989, 33% in 1999 and only 25% in 2009. Within the ten years from 1999 to 2009, the number of children aged 0–14 decreased by almost 4 million, from 25.3 million in 1999 to 21.0 million in 2009. At the same time, the proportion of people in working ages increased greatly, from 52.7% in 1979 to 69.1% in 2009. In last ten years, the population aged 15–64 years increased by 12.6 million, from 46.7 million in 1999 to 59.3 millions in 2009.

The proportion of the population aged 65 years and older has increased moderately. After 30 years, the proportion increased by only 1.6% (from 4.8% in 1979 to 6.4% in 2009). Because the proportion of the population in young ages declined, the child dependency ratio dropped substantially, from 80.8% in 1979 to 69.8% in 1989, 54.2% in 1999 to only 35.4% in 2009.

Table 3.3: Age structure, dependency ratios and aging index in Viet Nam, 1979-2009

	1979	1989	1999	2009
Age structure (%)				
0-14	42.6	39.2	33.1	24.5
15-64	52.7	56.1	61.1	69.1
65 and older	4.8	4.7	5.8	6.4
Dependency ratio				
Child dependency ratio	80.8	69.8	54.2	35.4
Aged dependency ratio	9.1	8.4	9.4	9.3
Total dependency ratio	89.9	78.2	63.6	44.7
Aging index (65+)	11.3	12.0	17.5	26.1
Aging index (60+)	16.6	18.2	24.3	35.5

Because both the population aged 65 and older and the proportion aged 15-64 increased and with similar speed, the aged dependency ratio was relatively constant around 9%. Because the child dependency ratio was large and declined quickly, the total dependency ratio also declined rapidly, but with a slightly slower pace. Data in Table 3.3 showed that, every non-working-age person corresponded to about one working-age person in 1979 (89.9 dependents per working age person), but with more than two working-age persons in 2009 (44.7 dependents per working age person). That means the total dependency ratio of the population in Viet Nam has declined by half in the past three decades.

Figure 3.10 Total dependency ratios in ASEAN countries, 2010

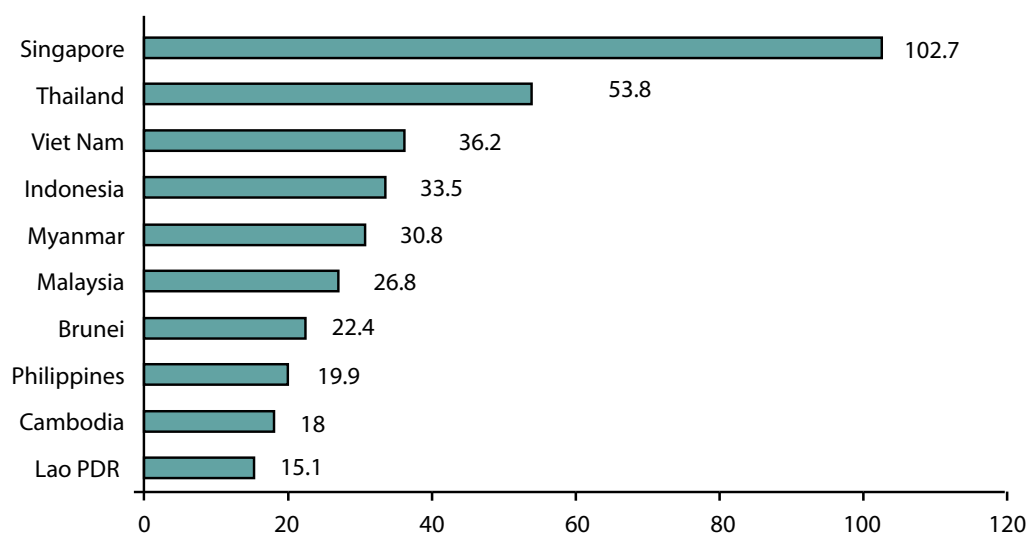
Source: United Nations, Population Division. *World Population Prospects: The 2008 Revision. Population Database. Medium Variant.*

When the total dependency ratio of the population (calculated using the working ages from 15–65) reaches 50, for every two working persons there is one dependent and the population enters the period of “population bonus” or “golden population structure”. Figure 3.10 presents the total dependency ratios (denominator is population aged 15–64) of ASEAN countries in 2010. The data indicate that, the total dependency ratio of Viet Nam ranks fourth in ASEAN and is higher than in Singapore, Thailand, and Brunei. In ASEAN, six countries are currently in the period of population bonus and four countries (Malaysia, Cambodia, the Philippines and Laos) have not.

Because of the decline in fertility rates and increased life expectancy, the aging index of Viet Nam has increased quickly in the past three decades. Data in Table 3.3 show that, the aging index (60+) has increased from 16.6% in 1979 to 18.2% in 1989, 24.3% in 1999 and peaked at 35.5% in 2009. Thus, in 1979, there was a person aged 60 years or older for every six children aged 0–14. Thirty years later, there is one aged person (60+) for nearly every three children aged 0–14.

Figure 3.11 reports the aging indices of ASEAN countries (numerator is population above 64 years). The projected aging index of the population in Viet Nam in 2010 is 36.2%, which ranks third among ten ASEAN countries and is higher than Laos, Cambodia, Philippines, Brunei, Malaysia, Myanmar and Indonesia, but lower than Thailand and much lower than Singapore. The aging index of population in Viet Nam is about one third of the index of Singapore (36.2% versus 102.7%).

Figure 3.11: Aging index of population in ASEAN, 2010

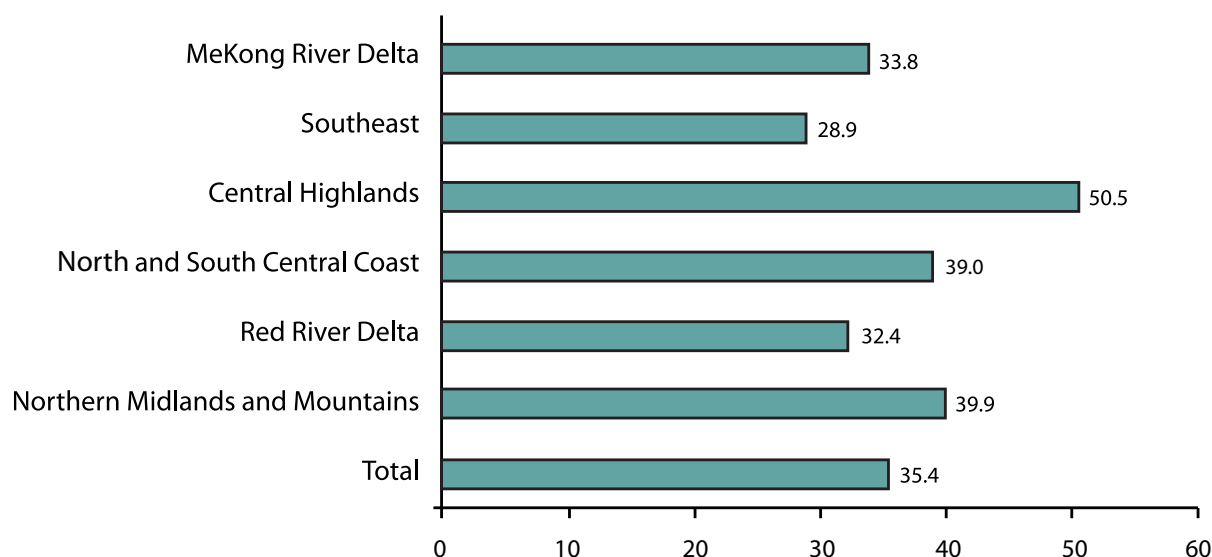


Source: According to United Nations, Population Division. World Population Prospects: The 2008 Revision. Population Database, Medium Variant (aging index of population in Viet Nam is measured using authors' projections)

3.2.2 Dependency ratio by region and province

Although the child dependency ratio of the national population mostly depends on changes in fertility (directly proportional to fertility), for regional and provincial populations, the ratio also depends on migration. Regions with large in-migration rates (positive net migration) would tend to have lower child dependency ratios and vice versa.

Figure 3.12: Child dependency ratio (calculated using working age population aged 15-64) by region in Viet Nam, 2009

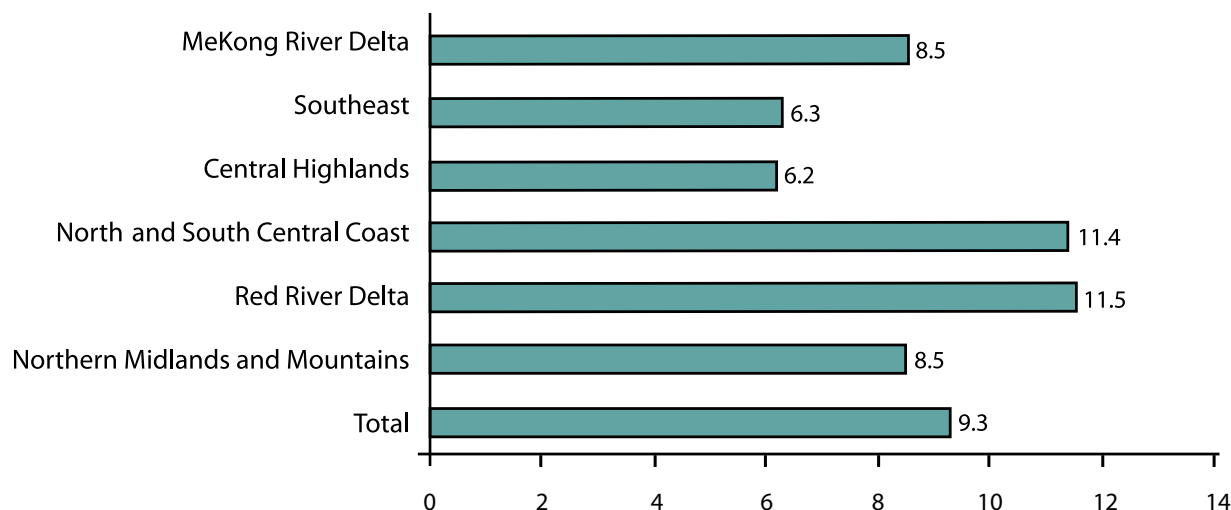


Among the six regions, the Southeast, Red River Delta and Mekong River Delta have the lowest child dependency ratios and lowest fertility rates (see Figure 3.12). In these three regions, there are more than three working-age persons per child (0–14 years). The TFRs in the 12 months before the 2009 Census for these three regions are respectively 2.11, 1.69 and 1.84 births per woman (CPHCSC, 2009). The child dependency ratio of the Southeast is very low, not only because of low fertility but also because of its very high positive net-migration rates. The net-migration rate from 2004 to 2009 was 107.7‰ (CPHCSC, 2009). The highest child dependency ratio was found in the Central Highlands. In this region, there are nearly two working persons per child under age 15. Among the 6 regions, the Central Highlands has the highest total fertility rate, which was 2.65 in the 12 months before the 2009 Census and about 1.6 times higher than in the Southeast.

In contrast to the child dependency ratio, aged dependency ratio in regions and provinces is not directly correlated with fertility but rather on mortality rates and migration. In regions with low mortality, or high life expectancy at birth, the proportion of the population in old ages tends to be higher and lead to a high aged dependency ratio.

Among the six regions, the Central Highlands and the Southeast have the lowest aged dependency ratio (see Figure 3.13). The aged dependency ratio of the Central Highlands is low because of both high mortality and high net in-migration, with a high share of migrants in working ages (CPHCSC, 2009:75). However, the low aged dependency ratio in the Southeast is not related to high mortality rates (Southeast has the highest life expectancy at birth) but primarily to high net in-migration rates. As presented above, the net migration rate of the Southeast in the five years before the 2009 Census was 107.7‰ (CPHCSC, 2010). As most of migrants to the Southeast are in working ages, high positive net migration contributes to the low aged dependency ratio.

Figure 3.13: Aged dependency ratio (calculated using working age population aged 15-64) by region in Viet Nam, 2009



The North and South Central Coast is not only the region with the lowest death rate but also has a high aged dependency ratio mostly because of migration. This is one of the regions with the highest negative net-migration (high out-migration) rate. According to the data from the 2009 Census, the net-migration rate in the five years before the Census in the North and South Central Coast was -34.6‰, which is second only to the Mekong River Delta (-40.4‰) (CPHCSC, 2009:13). As mentioned above, high out-migration reduces the proportion of the population in working ages and consequently increases the aged dependency ratio.

The aged dependency ratio of the Red River Delta is high not only because of low mortality but also because of migration. Though the negative net-migration rate in the Red River Delta is not high, -2.3‰, this region has high out-migration and in-migration rates of 16.1‰ and 18.5‰ respectively. Because most of the out-migrants are in working ages while the in-migrants include both people in working ages and beyond working ages, the proportion of people in working ages is notably low, and consequently aged dependency ratios are high.

Figure 3.14: Total dependency ratio by region, Viet Nam, 2009

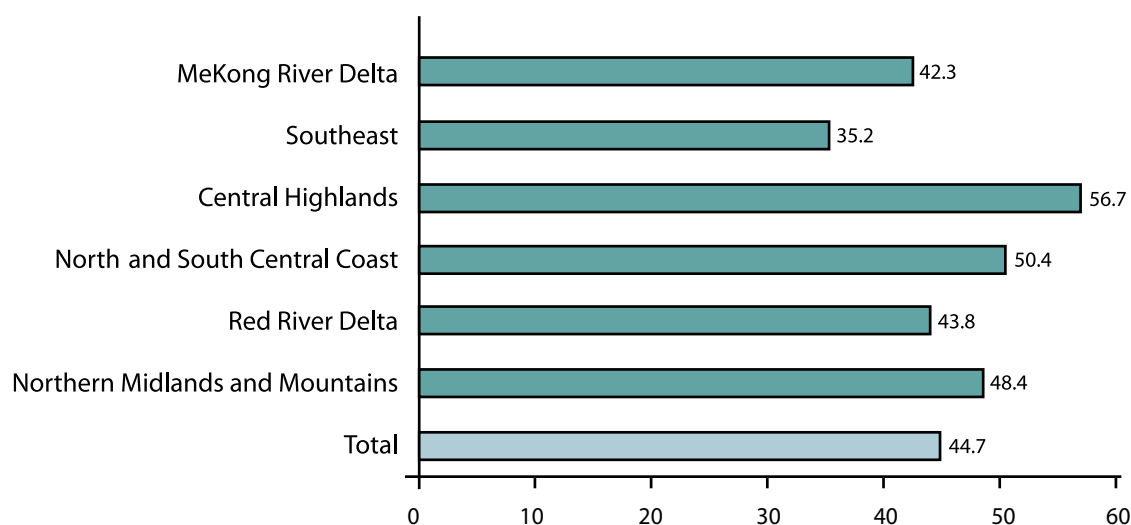
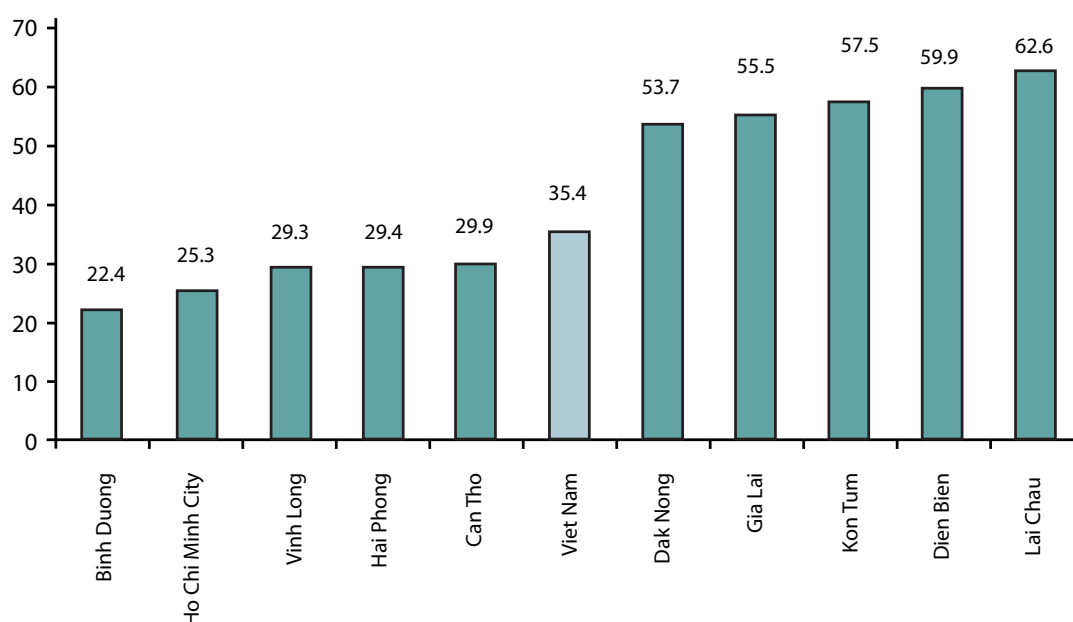


Figure 3.14 illustrates the differences in the total dependency ratio across regions. By 2009, as the child dependency ratio is much higher than the aged dependency ratio, the trends in the total dependency ratio are similar to trends in the child dependency ratio. The Southeast, Mekong River Delta and Red River Delta have the lowest total dependency ratios whereas the Central Highlands and North and South Central Coast have the highest total dependency ratios

At the time of the Census on 1 April, 2009, among the six regions, the Red River Delta, Northern Midlands and Mountains, Southeast and Mekong River Delta already had total dependency ratios less than 50%, indicating that they had entered into the period of “population bonus” or “golden population structure”. The North and South Central Coast already had a relatively low level of total dependency ratio at 50.4%, and will enter the period of “golden population structure” in 2010. Only the Central Highlands may need more time before it enters this period.

Figure 3.15: Five provinces with the lowest and highest child dependency ratios, Viet Nam, 2009



Because of substantial variation in fertility, mortality, and net migration rates, total dependency ratios also vary across provinces. Figure 3.15 compares the provinces with the lowest child dependency ratios and the provinces with the lowest child dependency ratios. As explained above, the child dependency ratio depends mostly on fertility and migration in the population. Thus, the five provinces with the lowest child dependency ratios (Binh Duong, Ho Chi Minh City, Hai Phong, Vinh Long, and Can Tho) are also the provinces experiencing low fertility /or high in-migration (positive net migration) or both. In contrast, the five provinces with the highest child dependency ratios (Lai Chau, Dien Bien, Kon Tum, Gia Lai, and Dak Nong) have the highest fertility among all the provinces.

Figure 3.16 presents the five provinces with the lowest and highest aged dependency ratios. It can be clearly seen that the five provinces with the lowest aged dependency ratios are Binh Duong, Dak Nong, Binh Phuoc, Lai Chau, and Kon Tum, i.e. provinces with either high mortality rates (Lai Chau, Kon Tum) or high in-migration rates (positive net migration) (Binh Duong) or both (Binh Phuoc, Dak

Nong). On the other hand, the five provinces with the highest aged dependency ratios are Ha Tinh, Thai Binh, Ha Nam, Quang Nam and Quang Tri. These provinces experience relatively high negative net migration rates and relatively low, but not the lowest, mortality rates.

Figure 3.16: Five provinces with the lowest and highest aged dependency ratios, Viet Nam, 2009

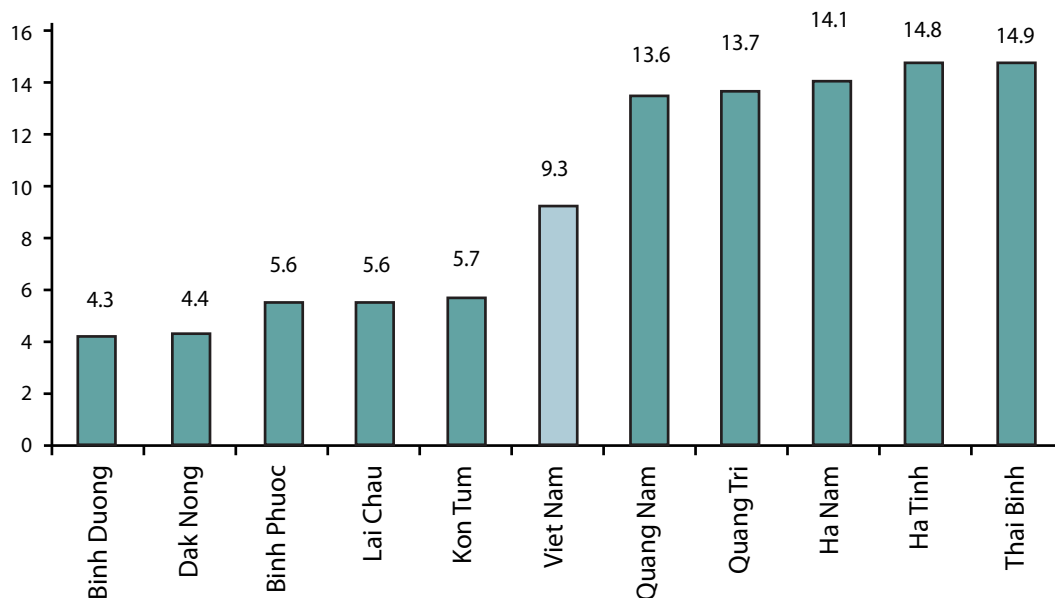


Figure 3.17 presents the total dependency ratios of all provinces in Viet Nam. They range from less than 30% as in Binh Duong province to higher than 70% as in Lai Chau, a large variation from the total dependency ratio of the whole country (44.7%). Figure 3.18 shows that, from 1999 to 2009, the total dependency ratios of all provinces have dramatically declined, even in provinces with high fertility and mortality.

Figure 3.19 compares the five provinces with the lowest and highest total dependency ratios. It is obvious that, the total dependency ratio is influenced by all major indicators of demographic dynamics, including fertility, mortality, out-migration, and in-migration. The provinces with low total dependency ratio must experience at least one of the factors: low fertility (fewer children), low life expectancy at birth (fewer old people), or high positive net migration (lost people in working ages). On the other hand, provinces with high dependency ratios should have at least one of the following factors: high fertility, low mortality, high negative net-migration rate or a combination of at least two or all of these factors.

Figure 3.17: Aged and child dependency ratios by province in Viet Nam, 2009

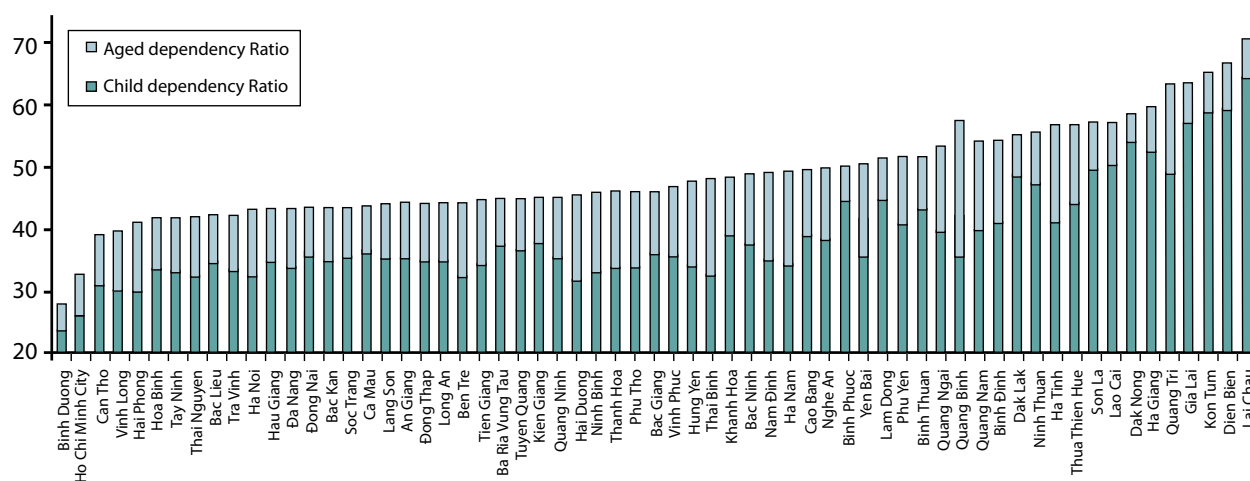


Figure 3.18: Total dependency ratios by province in Viet Nam, 1999 and 2009

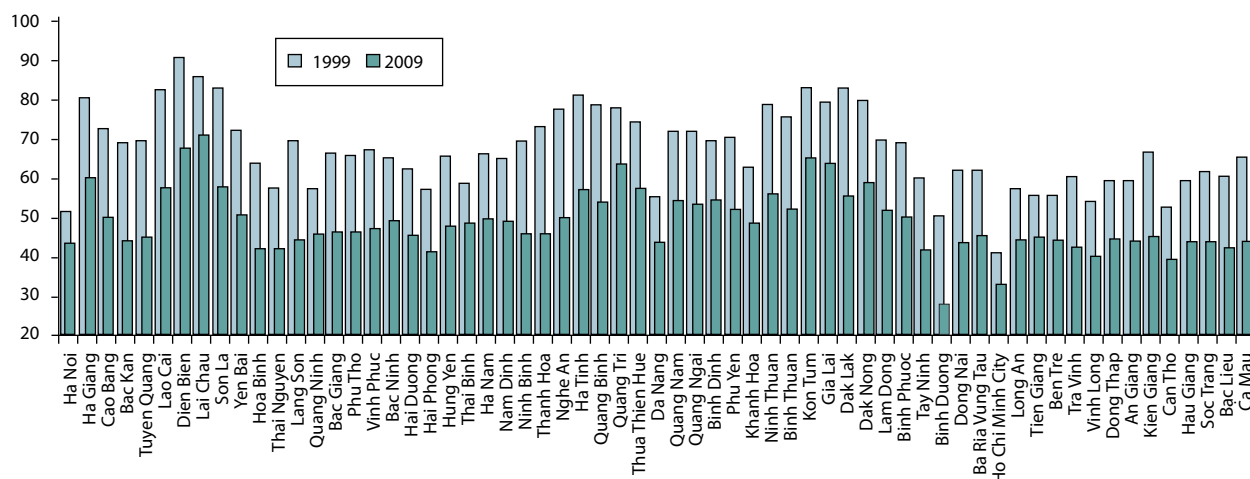
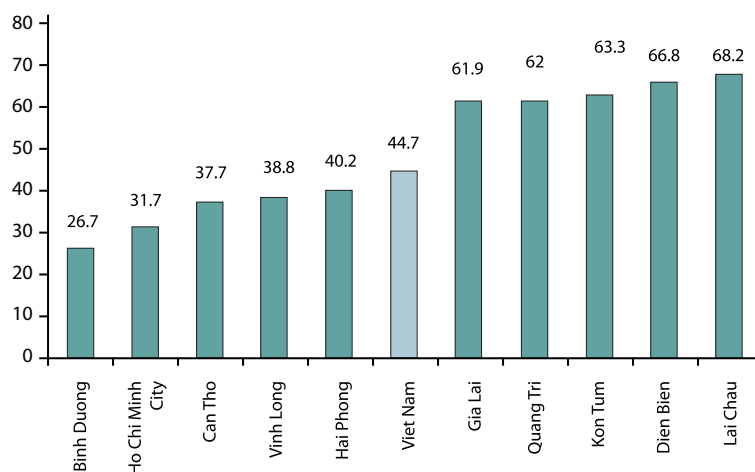


Figure 3.19: Comparison of the five provinces with the lowest total dependency ratios and five provinces with the highest total dependency ratios in Viet Nam, 2009



The five provinces with the lowest total dependency ratio (Binh Duong, Ho Chi Minh City, Can Tho, Vinh Long and Hai Phong) are also those with the lowest fertility and highest positive net-migration. Lai Chau, Dien Bien, Kon Tum and Gia Lai are the provinces with the highest total dependency ratios, and the highest fertility among all provinces in Viet Nam. The TFRs in the 12 months before the Census were respectively 2.96, 2.55, 3.45 and 2.88 children per woman. Quang Tri province had the fifth highest total dependency ratio and the highest fertility in the North and South Central Coast region (2.85 children per woman). This province also had low mortality and high negative net migration (-35.9‰), which combined with high fertility led to it having a high total dependency ratio.

Until 1st April 2009, 43 out of 63 provinces experienced total dependency ratios under 50%, which means they have entered the period of “golden population structure”. This is a favourable condition for these provinces to develop economically, to increase capital accumulation, and to increase GDP per capita. Among the remaining 20 province, nine reporting total dependency ratios of less than 55%, which means they are likely to enter the period of “golden population structure” over the next five years. Among these provinces are Phu Yen, Lam Dong, and Binh Thuan, with total dependency ratios of 51.1–51.2%. It is expected that they will enter the period of “golden population structure” by 2010 or 2011. Other provinces may not achieve the population bonus during the next five years but their total dependency ratios are not very high. The highest total dependency ratio is found in Lai Chau province (68.2%), which means there is one dependent for every 1.5 working persons.

3.2.3 Aging index by geographical region and by province

The aging index is calculated as the ratio of the aged population (starting from 60 or 65 years of age) per 100 people aged under 15. Figure 3.20 present regional variation in the aging index (for population above 60 years). The highest aging index is 47.7% in the Red River Delta and the lowest is 17.3% in the Central Highlands. In the Central Highlands, for every 6 children under 15 years of age there is an aged person. In the Red River Delta, for every two children under 15 years of age, there is an aged person. Nationally there is one aged person for every three children.

Figure 3.20: Aging Index of population by region in Viet Nam, 2009

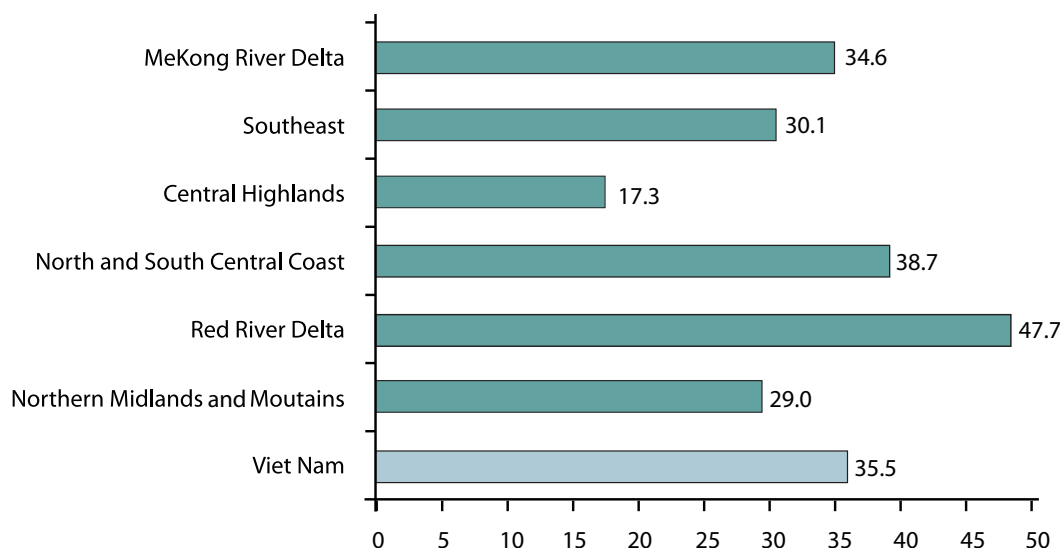
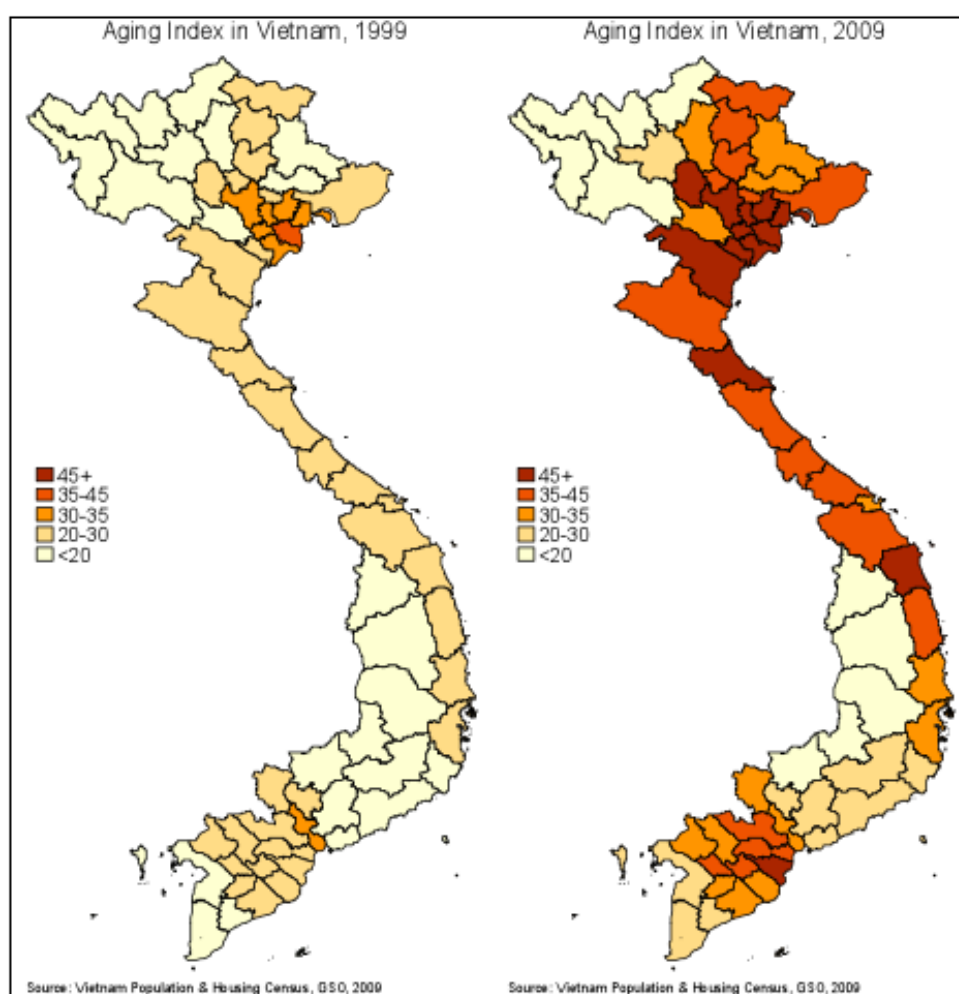


Figure 3.21 consists of maps showing provincial variation in the aging indices (for population aged 60+) from the 1999 and 2009 Censuses. It is obvious that after ten years, the population of Viet Nam's population has aged considerably but to different extents across provinces. In 1999, only seven provinces in the Red River Delta and Ho Chi Minh City had aging indices higher than 30. By 2009 however, not only the Red River Delta but also almost all provinces in former Northeast, the North and South Central Coast and the Southeast and some neighbouring provinces are experiencing this level of the aging index. Seven provinces with the aging index over 50 consist of Hung Yen, Ha Nam, Nam Dinh, Hai Duong, Thai Binh, Ninh Binh, and Ha Tinh. Most are in the Red River Delta with relative low fertility and a large number of in-migrants of retirement age compared to in-migrants aged under 15. The aging indices in most provinces in the former Northeast and Central Highlands remain lowest (under 20).

Figure 3.21: Maps of aging index (60+) by province in Viet Nam, 1999 and 2009

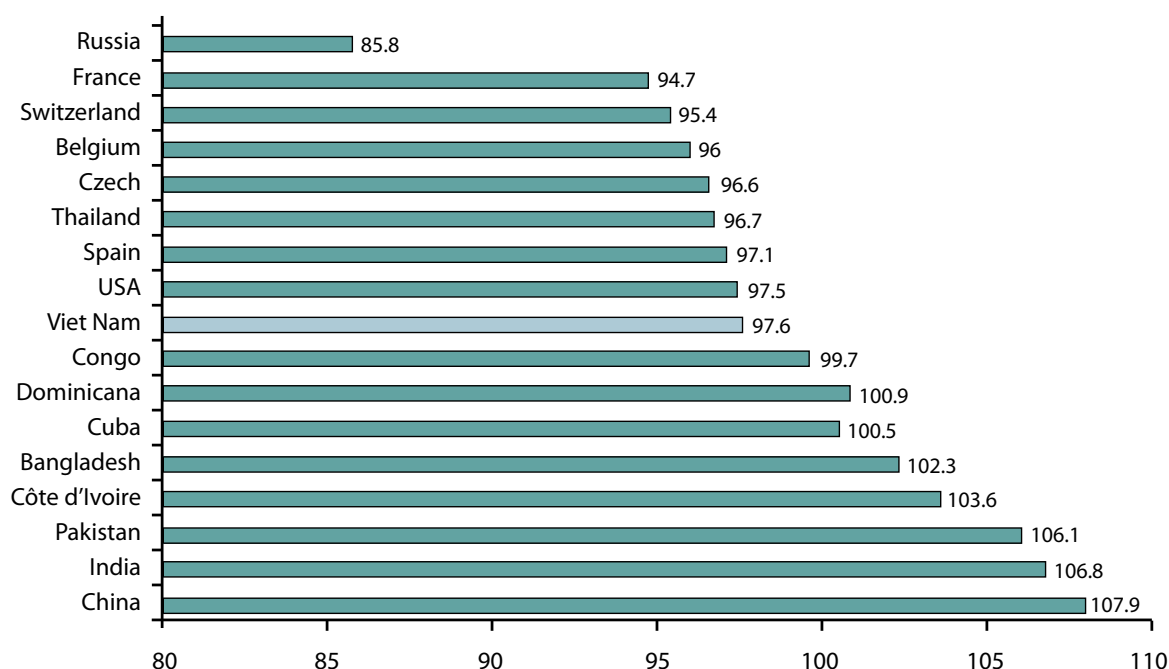


3.3 SEX RATIO

One important indicator in studying sex structure of a population is the sex ratio. The sex ratio is measured by dividing total number of males by females and multiplying by 100, and indicates how many males there are for every 100 females in a given population. The sex ratio of different

populations varies because of demographic and socioeconomic influences. In general, sex ratios in developing countries are often higher than in developed countries. Migration can play a crucial role in determining sex structure of a population when net migration rates are large and vary by sex. Imbalanced sex ratio at birth related to sex selection of the foetus prior to birth and of the child after birth contribute to abnormally high sex ratios in some countries.

Figure 3.22: Sex ratio in Viet Nam and selected countries, 2010

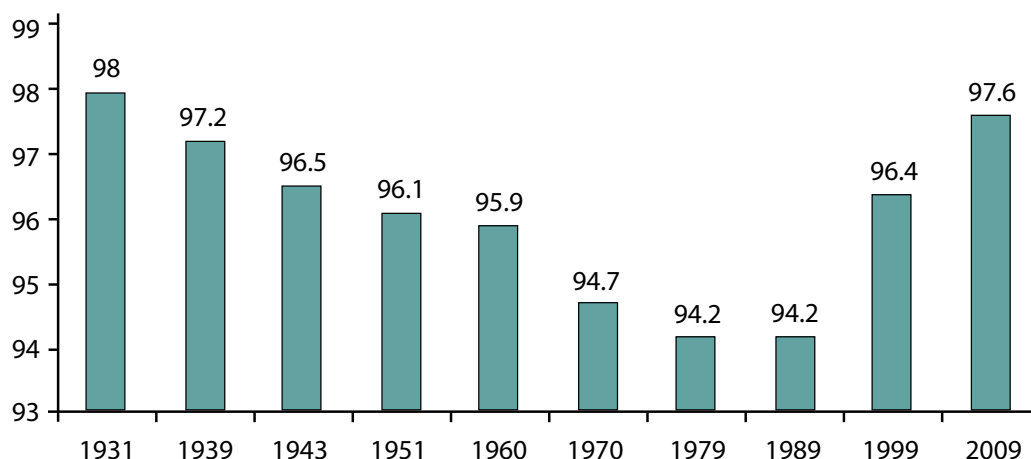


Source: Word Population Prospects: The 2008 Revision Population Database, United Nations, 2009

According to UN projections, developed countries such as Russia, France, Switzerland, Belgium, Spain, and the United States report low sex ratios, but high sex ratios are often found in developing countries, such as Pakistan, Bangladesh, Dominica, and the Congo (Figure 3.22). In China and India, the levels of economic development are relative high but the phenomena of foetal sex selection and child sex selection are quite common (the sex ratio at birth in China in 2005-2010 was 120 males per 100 females).

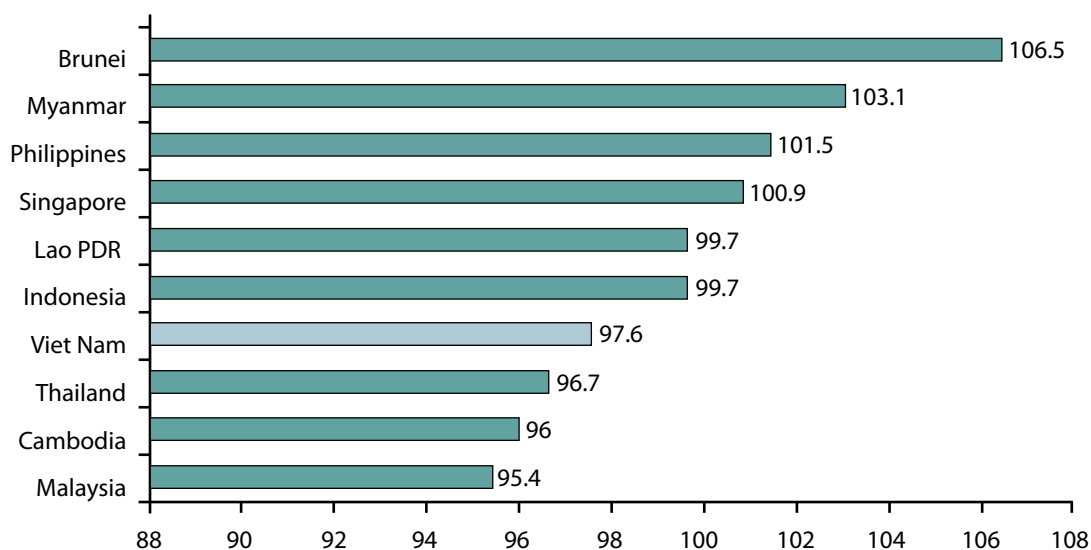
Figure 3.23 presents the trends in the sex ratio of Viet Nam since 1931. The sex ratio of Viet Nam continuously decreased from 98.0 males per 100 females in 1931 to 94.2 males per 100 females in 1989, as a consequence of a series of wars between 1946–1954 (French War), 1954–1975 (American War) and 1978–1979 (Cambodian and Chinese border war). After the wars, together with the process of socio-economic development, the sex ratio of Viet Nam's population has become more balanced, increasing from 94.2 males per 100 females in 1989 to 96.4 males per 100 females in 1999 and to 97.6 males per 100 females in 2009. The increase in the sex ratio at birth in the last ten years has significantly influenced the sex ratio of the total population in Viet Nam. Among the 10 ASEAN member countries, the sex ratio in Viet Nam is low, and only exceeds that in Thailand, Cambodia, and Malaysia (Figure 3.24).

Figure 3.23: Sex ratio in Viet Nam, 1931-2009



Source: - 1931-1979: Viet Nam Population Census 1989, Sample Analysis, GSO, Hanoi – 1991, page14 - 1989 and 1999: Authors estimates using Census data. Management Unit of the Central Population Census, Hanoi,-1991 and Results of Census. General Statistics Office. Statistical Publishing House. Hanoi, 8-2001.

Figure 3.24: Sex ratio of ASEAN member countries, 2010



Source: Word Population Prospects: The 2008 Revision Population Database, United Nations, 2009

Table 3.4 shows the change in the sex ratio by age group in Viet Nam in 1979, 1989, 1999 and 2009. Normally the sex ratio at birth is about 105 males per 100 females. Because male mortality is higher than female mortality, the sex ratio by decreases by age and eventually falls below 100 at some age group. In general, the sex ratio declines as age increases.

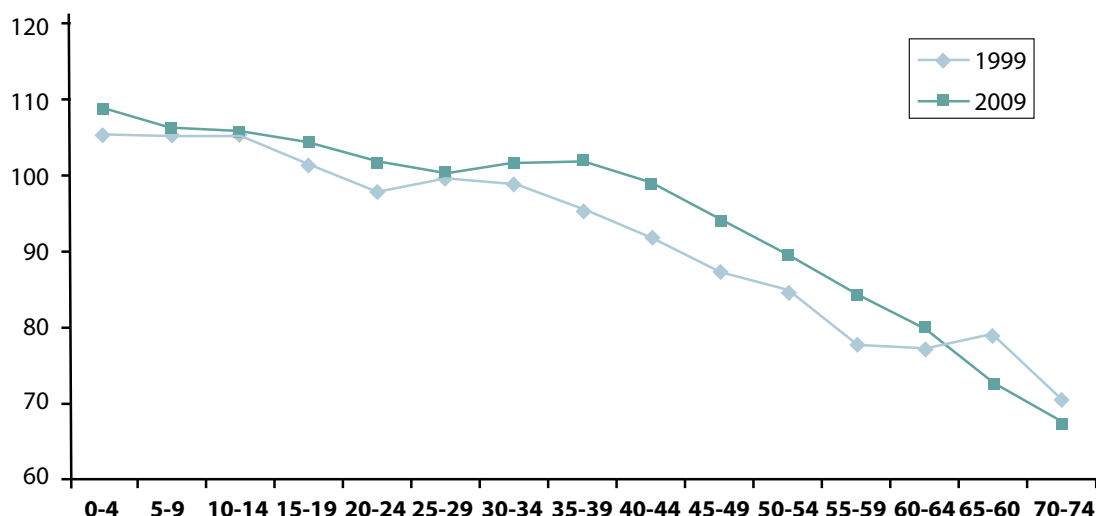
Data in Table 3.4 and Figure 3.25 indicate that the sex ratio among under-five children is abnormally high. The main reason is that the sex ratio at birth has increased, especially in the past five years (UNFPA 2009). The sex ratio among the population under 15 years of age is also relatively high (106.9), but the sex ratio among the working-age population is almost balanced (99). In addition, there appears to be an unusual shortage of males in the age groups 20–24 and 25–29 and to a lesser extent for the age groups 15–19 and 25–29 as seen in data from the 2009 Census.

Table 3.4: Sex ratio by age group in Viet Nam, 1979-2009

Age group	1979	1989	1999	2009
0–4	104.8	105.6	105.5	108.7
5–9	104.4	104.2	105.4	106.3
10–14	106.6	105.0	105.5	105.7
15–19	96.5	97.4	101.5	104.4
20–24	87.7	92.0	98.1	101.8
25–29	88.2	91.1	99.8	100.5
30–34	89.6	91.4	99.1	101.7
35–39	87.5	87.6	95.3	102.0
40–44	84.7	86.5	92.0	99.0
45–49	89.3	81.5	87.6	94.1
50–54	91.5	80.5	84.6	89.4
55–59	78.0	85.8	77.8	84.2
60–64	81.5	82.8	76.9	80.1
65–69	74.9	74.0	78.8	72.5
70–74	65.4	68.2	70.4	67.3
75+	53.2	55.1	54.1	49.9
Total	94.2	94.2	96.4	97.6

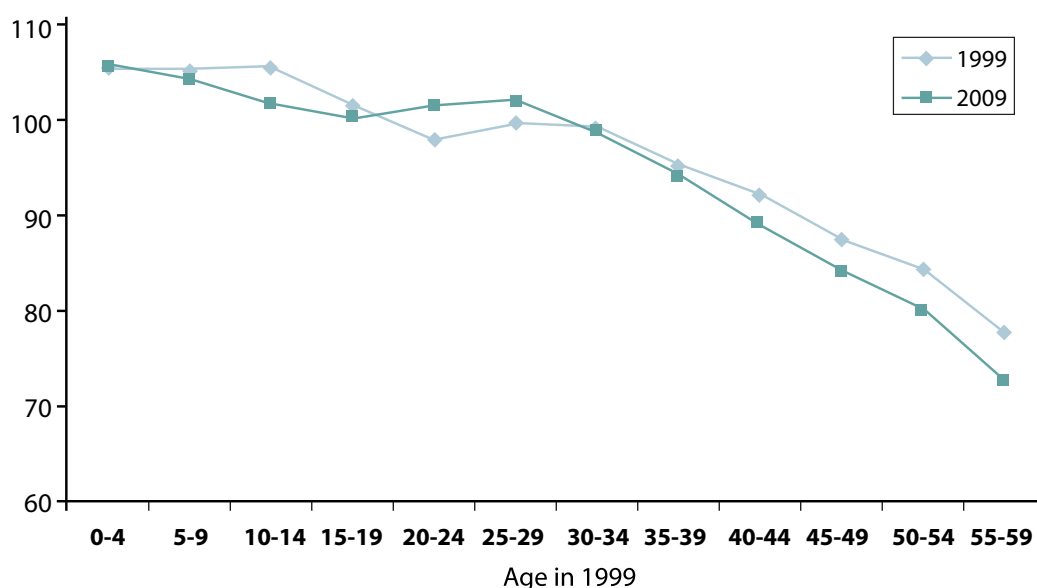
The chart on sex ratio by age group reveals that there is an unusual change (concavity) in these age groups (Figure 3.25). This is maybe because of underreporting of males in these age groups. The phenomenon can be seen clearly not only in the data of the 2009 Census but also in all population Censuses of all surveyed years. The sex ratio of the age group 20–24 in all Censuses decline suddenly compared with the age group 15–19, especially compared with the sex ratio of the same generation in the previous Census.

Figure 3.25: Sex ratio by age group in Viet Nam, 1999-2009



For instance, the sex ratio at birth of the age group 10–14 in 1999 was 105.5 males over 100 females. This is a normal sex ratio. After ten years, the population of the previous age group 10–14 would become the age group 20–24 in 2009 and because male mortality tends to be higher than female mortality, the sex ratio of the cohort aged 20–24 in 2009 may decline slightly compared with the cohort aged 10–14 in 1999. However, the sex ratio of this group in 2009 falls abruptly to 101.8 males per 100 females. If the international migration effects are insignificant, there may be undercounts in the survey for males aged 20–24 in the 2009 Census. A similar trend occurs when comparing the sex ratio of the age group 20–24 in 1999 to the age group 10–14 in 1989 as well as the age group 20–24 in 1989 to the age group 10–14 in 1979 (same birth cohort). This can be seen in the chart comparing the sex ratio of birth cohorts in the 1999 and 2009 Censuses (Figure 3.26).

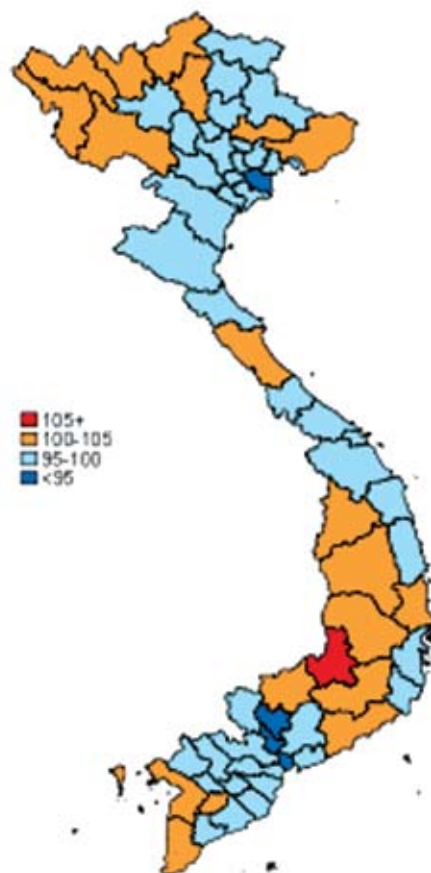
Figure 3.26: Sex ratio by cohort in Viet Nam, 1999-2009



**Figure 3.27: Maps of sex ratios by province in Viet Nam
(total population and under age 15), 2009**

Sex Ratio in Vietnam, 2009

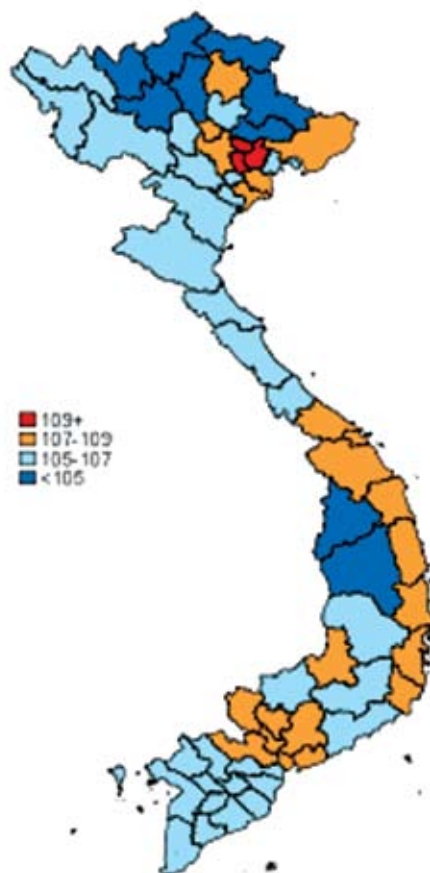
Total population



Source: Vietnam Population & Housing Census, GSO, 2000

Sex Ratio in Vietnam, 2009

Under - 15 Population

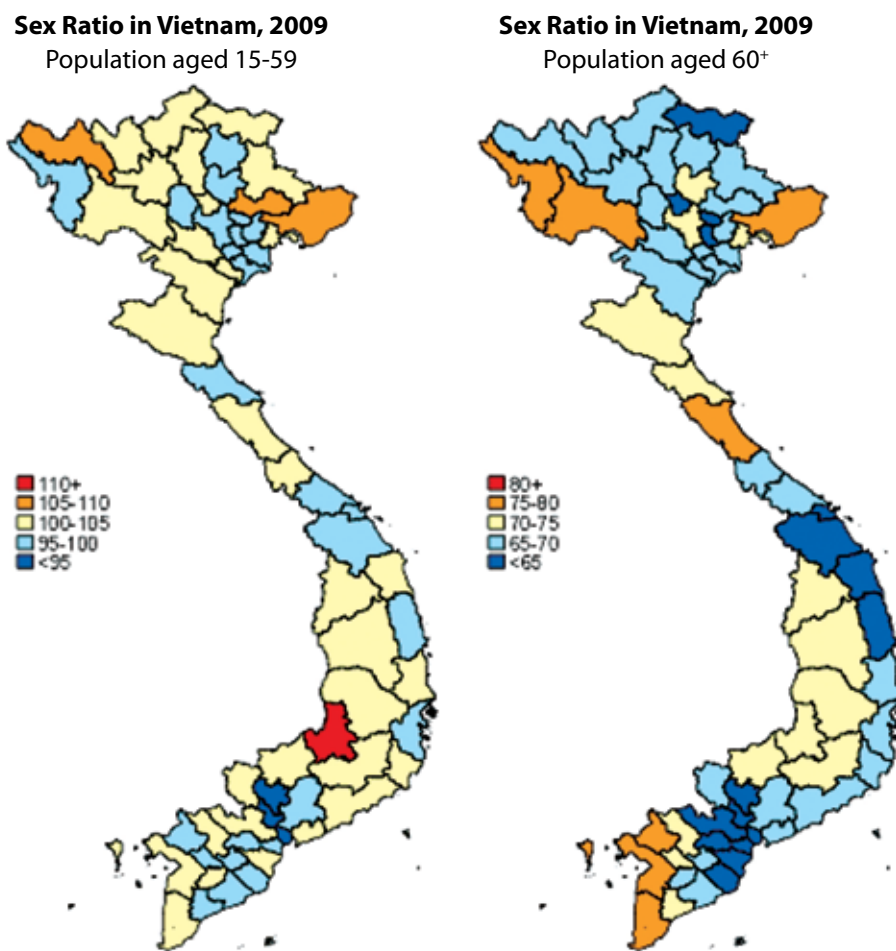


Source: Vietnam Population & Housing Census, GSO, 2000

Maps of the sex ratio by province for the total population in 2009 and for three age groups are presented in Figure 3.27 and Figure 3.28. For total population, most provinces of Viet Nam have normal or low sex ratios. Three provinces (Thai Binh, HCMC, and Binh Duong) have low sex ratios (less than 95) and only Dak Nong province has a sex ratio higher than the normal level (over 105).

Meanwhile, the sex ratios of the population under age 15 in 54 provinces are higher than the normal value (<105). Three provinces with the highest sex ratios (>109) are Bac Ninh, Hung Yen and Hai Duong. The sex ratios among the population under age 15 are close to the normal level (i.e. from 103–105) in only 9 provinces, including 7 provinces in the Northern Uplands and 2 provinces in the Central Highlands. Thus, it is likely that the situation of male surplus and female shortage at marital age will become more common in Viet Nam in the near future.

Figure 3.28: Maps of sex ratios by province in Viet Nam (age 15-59 and age 60 and older), 2009



Source: Vietnam Population & Housing Census, GSO, 2000

Source: Vietnam Population & Housing Census, GSO, 2000

In general, the distribution of sex ratios across provinces among the population aged 15-59 is similar to that of the total population, but with a slightly higher range. For this age group, Ho Chi Minh City and Binh Duong also have very low sex ratios (less than 95). However, not only Dak Nong (as with the sex ratio for the whole population) but also Bac Giang, and Quang Ninh have high sex ratios (>105). It is expected that the sex ratios among the population 60 years of age and older in all provinces will be low. For this population sub-group, only 7 provinces have sex ratios higher than 75, but as many as 14 provinces (Cao Bang, Vinh Phuc, Bac Ninh, Hung Yen, Da Nang, Quang Nam, Quang Ngai, Binh Dinh, Binh Duong, Ho Chi Minh City, Long An, Tien Giang, Ben Tre, and Tra Vinh) have sex ratios below 65. This means that among the aged population in these 14 provinces, there are only two men for every three women.

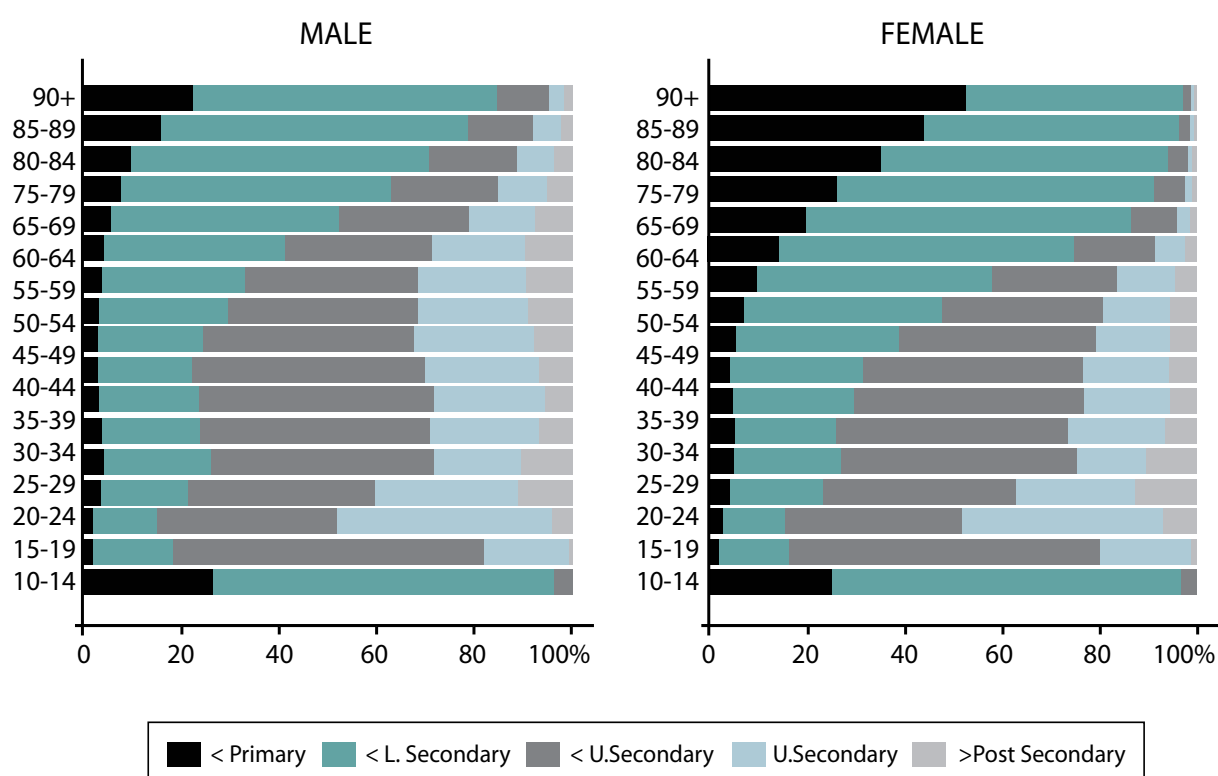
3.4 EDUCATIONAL ATTAINMENT AND WORKING STATUS BY AGE AND SEX

3.4.1 Educational attainment

Figure 3.29 compares the educational attainment by age and sex of the population aged 10 and older in Viet Nam in 2009. In general, the educational attainment of the young population has

improved compared with the older population. The proportion of the population with less than lower secondary education declines quickly by age (except for the age group 10–14 currently enrolled in this level of education). The age groups 30–34 and 15–19 for both males and females are unusual in the lower educational attainment. The proportion of the population with educational attainment below lower secondary school in these groups is higher than the next higher age groups. This may be evidence of the decline in quality of elementary and secondary schooling in the corresponding periods or related to economic conditions that increase demand for labour or reduce ability to pay for education during these periods, i.e. 1990–1995 and the five most recent years. It is difficult to verify this because educational attainment not only depends on educational quality but also on educational standards (for instance, the extent to which schools over-report performance) in a particular period.

Figure 3.29: Distribution of education by age and sex in Viet Nam, 2009



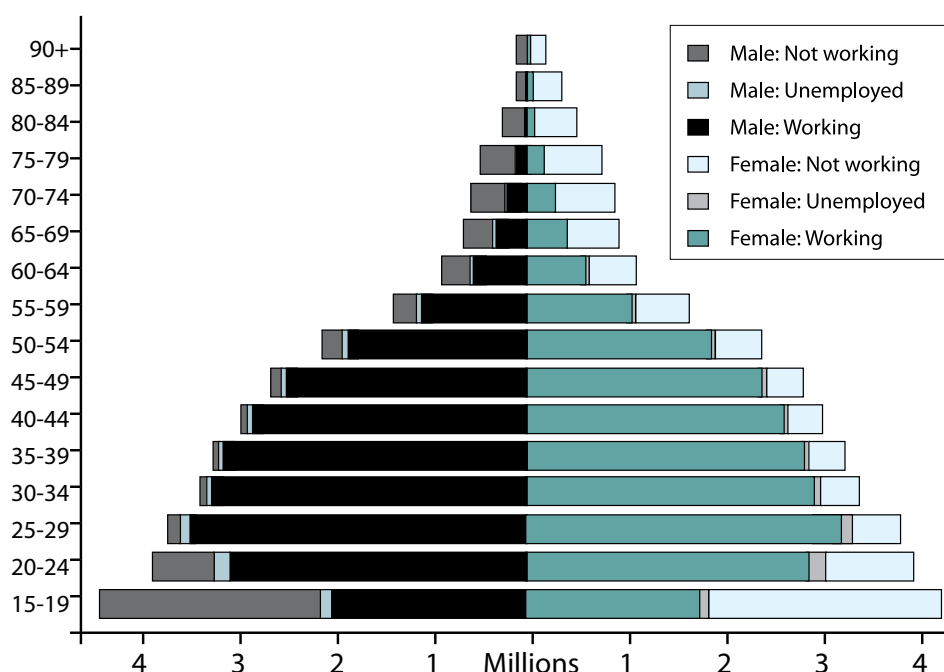
Data show substantial increases in the proportion of population with upper secondary and higher education in the 25–29 and 20–24 age groups, especially for females. This not only affirms the higher educational attainment of young people in recent years, but also the decline in the educational disparities between males and females. Even though on average, the educational attainment of males is higher than females, for the age groups 20–24 and 25–29, the proportion of females with post-secondary education is higher than for males.

3.4.2 Working status

The distribution of working status by age and sex is presented in Figure 3.30. Working status is divided into three categories: not working (i.e. not participating in the labour force), unemployed, and working. In general, the proportion of not working among females in all age groups is higher than among males, especially for the main working age group (25–59). The reason may be that women are more likely to stay at home doing housework or bearing and raising children than males.

It is noteworthy that despite high reported levels of educational attainment, the unemployed proportion among the young, especially for the age group 20–24, is higher than among the older groups. In particular, the unemployed proportion is 1.65% in the 30–39 group, but 3.53% in the 20–29 group and 4.25% in the 20–24 group. The fact that young adults have higher levels of unemployment despite their advantages in physical labour and education may be related to their limited practical skills as well as some social norms, which hinder fair competition between young workers and people with seniority in the labour market.

Figure 3.30 Distribution of working status by age and sex in Viet Nam, 2009

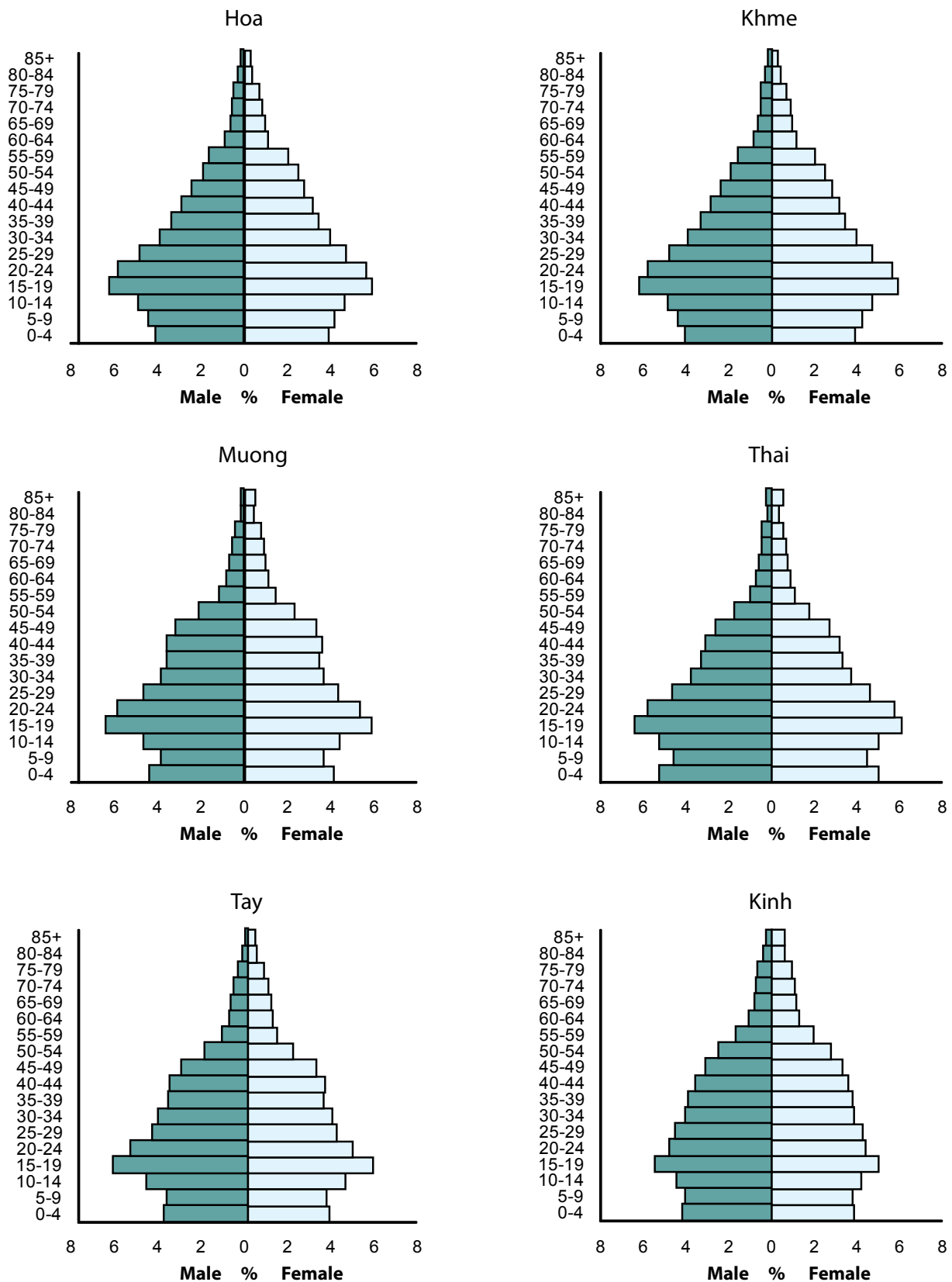


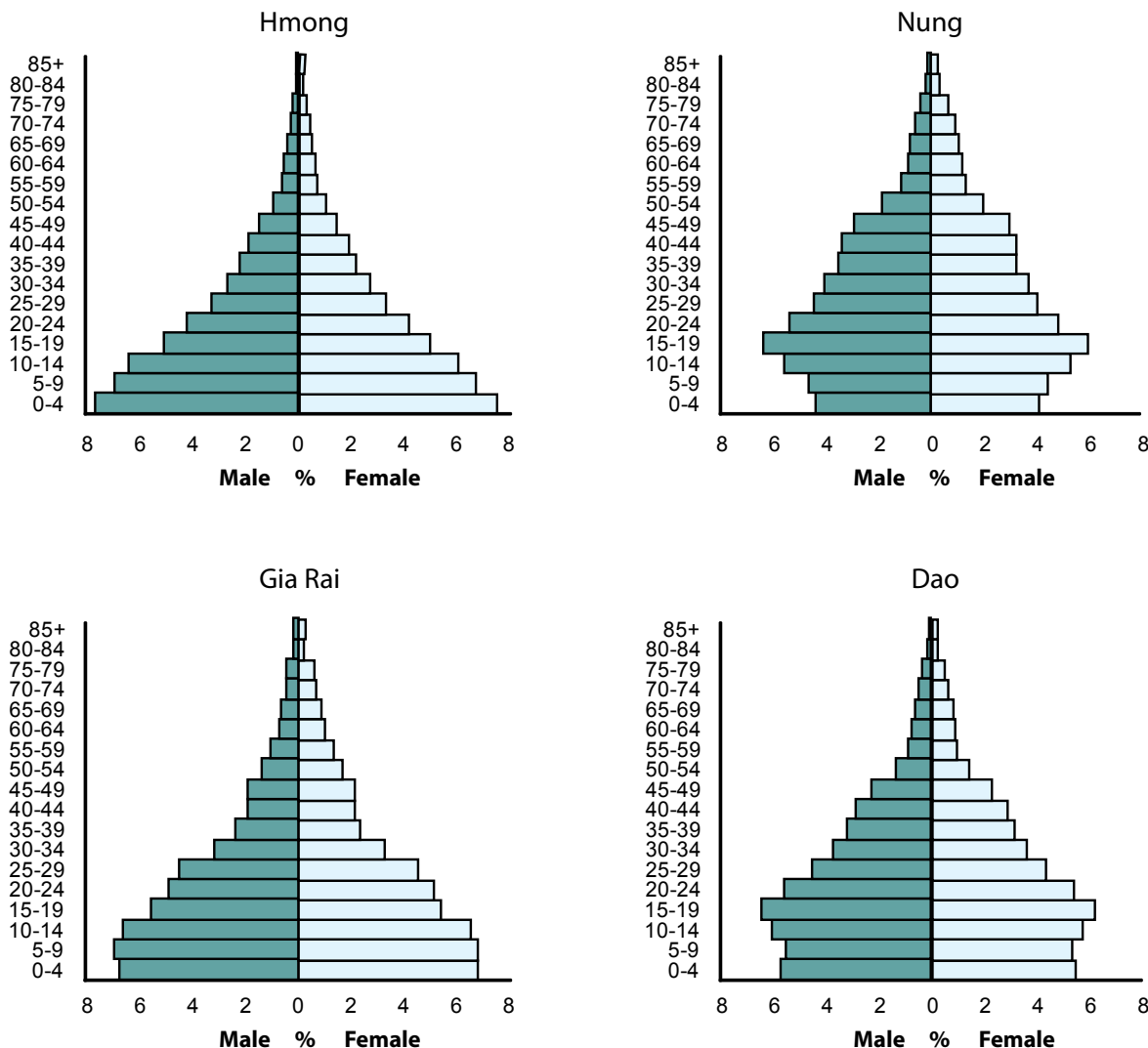
3.5 AGE-SEX STRUCTURE BY ETHNICITY, MIGRANT STATUS AND DISABILITY

3.5.1 Age-sex structure of the ten largest ethnic groups

The 2009 Viet Nam Population and Housing Census collected information on 54 ethnic groups in Viet Nam and of naturalized Viet Nameese citizens originally from other countries. For purposes of this monograph, however, details of the age-sex structure of ethnic groups will be investigated with regard to the ten largest ethnic groups, including the Kinh, Tay, Thai, Muong, Khmer, Hoa, Nung, Hmong, Dao, and Gia Rai.

Figure 3.31: Age pyramids of the 10 largest ethnic groups in Viet Nam, 2009





Data presented in age pyramids of three ethnic groups, the Hmong, Dao and Gia Rai reveal relatively high fertility and mortality. The pyramid base is large and the pyramid narrows quickly towards the top. Among these three ethnic groups, the Hmong have very high fertility with only slight declines in recent years. The TFR of the Hmong in the 12 months before the 1989 Census was 9.3 children and by 1999 it had fallen, but was still high at 7.1 children (GSO 2002), a decline of only 24.1%, the next to lowest decline only after the Gia Rai.

The fertility rate of the Gia Rai ranks second among the ten largest ethnic groups and constitute the group with the slowest decline. The TFR of the Gia Rai in the 12 months before the 1989 Census 1989 was 5.5 children, and by 1999 it remained high at 5.3 children (GSO 2002), which was a 3.3% decline compared with 1989. The age pyramids of both the Hmong and Gia Rai have very sharp tops. The Dao has the third highest fertility rate among the ten large ethnic groups but the fertility rate declined more rapidly than among the Hmong and Gia Rai. The mortality rate among the Dao is also high.

The Nung, Khmer, and Hoa are the ethnic groups that have shown a constant decrease in fertility over the past 15 years, and relative low mortality. The age pyramids of these ethnic groups have steadily narrowing bases, relatively large bodies, and the tops do not narrow very abruptly. Among

these three ethnic groups, the age pyramid of the Hoa group is the most unusual. Though the three bands at the bottom gradually narrow towards younger cohorts, the narrowing is more gradual than in the age pyramids of the Nung and Khmer groups. The pyramid body of the Hoa group is relatively vertical, and even narrows in the age groups 20–24 and 25–29 compared to the age group 30–34. This may be the result of international emigration. Among the ten largest ethnic groups, the Hoa group is the only one reporting a decline in population in 2009, compared with 1999.

Three ethnic groups, the Tay, Thai and Muong have similar age-sex structures so their age pyramids have similar shapes. They underwent rapid decline in fertility during the period 1994–1999 and 1999–2004. However, because births in the five years before the Census increased, the age group 0–4 is larger than the 5–9 age group. These three ethnic groups have moderate levels of mortality so the pyramid bodies are larger than among the Hmong, Gia Rai and Dao groups. The Kinh group accounts for 86% of the total population hence the age-sex structure of the Kinh group is similar to the age-sex structure of the whole population.

Data in Table 3.5 indicate that, among the ten largest ethnic groups, the Hmong and Gia Rai have young populations, which means the proportion of the population under 15 years of age is higher than 35%. The proportion of population under 15 years old among the Hmong and Gia Rai were 45.8% and 39.9% respectively. The other ethnic groups are in different stages of aging yet no ethnic minorities have entered the period of an “aged population”. Ethnic groups with the proportion of children 0–14 under the national average are the Hoa (22.3%), Kinh (23.4%) and Tay (24.2%). For the population aged 60 years and older, only two ethnic groups have higher proportions than the average, these are the Hoa and the Kinh groups and their proportions are 10% and 9%, respectively. Therefore, only the Hoa and Kinh groups experience higher aging indexes than the national average. At the time of the Census on 1 April, 2009, among the Hoa, there were 4.5 aged persons for every 10 children under age 15, whereas, among the Hmong, there was only 1 aged person for every 11 children. The Dao and Gia Rai groups also reported very low aging indices, with one person aged 60 and older for every seven children under 15 years of age.

Table 3.5: Age structure, aging index, dependency ratio and sex ratio of the ten largest ethnic groups in Viet Nam, 2009

	Proportion of population			Aging index	Dependency ratio			Sex ratio
	0-14	15-59	60+		Child	Aged	Total	
Total	24.5	66.9	8.9	35.5	35.4	9.3	44.7	97.6
Kinh	23.4	67.6	9.0	38.5	33.5	9.6	43.1	94.7
Tay	24.2	67.9	7.9	32.5	34.6	8.3	42.9	98.7
Thai	29.0	64.6	6.4	22.0	43.8	7.2	51.0	99.3
Muong	24.9	67.9	7.2	28.9	35.7	7.6	43.3	98.9
Khmer	25.6	67.4	7.0	27.3	37.0	7.3	44.3	96.1
Hoa	22.3	67.6	10	44.9	31.7	10.3	42.1	105.2
Nung	27.8	64.8	7.4	26.5	41.6	7.9	49.5	100.5
Hmong	45.8	50.0	4.2	9.1	89.4	5.6	95.0	101.3
Dao	33.5	60.8	5.6	16.7	53.7	6.4	60.0	100.9
Gia Rai	39.9	54.1	6.0	15.0	71.4	7.8	79.2	96.4

Among the ten largest ethnic groups, there are six ethnic groups with total dependency ratios under 50%, which means they have entered the “golden population structure”. The Hoa and Tay groups report the lowest total dependency ratios, at 42.1% and 42.9%, respectively. The Kinh and Muong groups also report low total dependency ratios at 43.1% and 43.3% respectively. For these ethnic groups, every 2.5 working persons (15-64 years old) would have to support only one dependent. The Thai group has not yet obtained the “golden population structure” but they will enter this period in 1 to 2 more years because their total dependency ratio is currently at 51%. The Hmong, Gia Rai, and Dao groups have moderately high total dependency ratios, at about 60% to 95%.

Four among these ten ethnic groups have a total sex ratio of more than 100%, which means there are more males than females. They are the Hoa (105.2%), Hmong (101.3%), Dao (100.9%) and Nung (100.5%) groups. The sex ratios of the Hmong, Dao and Nung are high mostly because of their low living standards and lack of education, which lead similar mortality rates between males and females. Though the sex ratios for the population under 1 year of age and the population from 1–4 years of age are within the normal range among the Nung (107.0 and 105.5), the Hmong (101.6 and 102.4), and the Dao (104.3 and 105.3) yet their overall population sex ratios are relatively high. The high total sex ratio among the Hoa can be explained by two reasons. First, there may be sex selection, which leads to a high sex ratio of children under aged one (108.9%), and aged 1–4 (110.6%). Second, there is net international emigration among young and middle-aged Hoa females, which leads to a high sex ratio in these age groups. The sex ratio of the age groups 30–34 and 35–39 among the Hoa are high, with 120.3 males per 100 females.

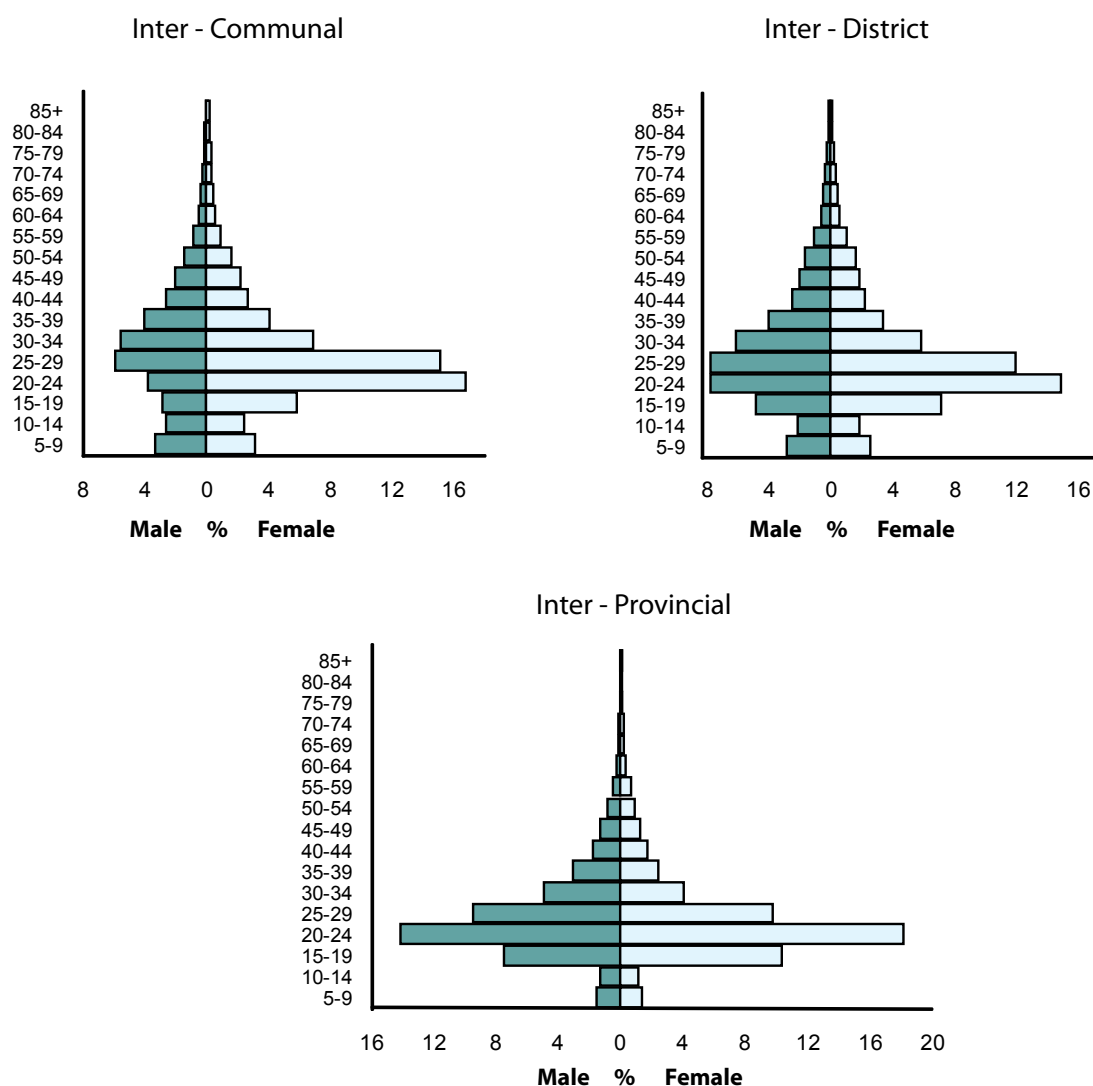
3.5.2 Migrants

From a demographic perspective, migration leads to changes in quantity, structure, and especially age-sex structure of the population at the origin and destination locations. Because the age-sex structure of each type of migration varies, the impact of migration on the age-sex structure also varies. Figure 3.32 presents the age pyramids of three types of migrants, including inter-communal, inter-district, and inter-provincial migrants.

The first pyramid illustrates the age-sex structure of the inter-communal migrants (within the same district). It is obvious that migration in general and inter-communal migration in particular occurs primarily among the young and middle age people. Only five age groups, from 15–39, account for 70% of all inter-communal migrants. In particular, for every 10 inter-communal migrants, four of them belong to the age groups 20–24 and 25–29.

Data in Table 3.6 show that, among inter-communal migrants, female migrants account for two thirds (63.6%), especially among younger groups. For every 10 inter-communal migrants in the age group 20–24, there are 8 females (81.5%). In the age group 25–29, the proportion female is almost three fourths (72%). The proportion female among migrants in the age group 15–19 is also high. For inter-communal male migrants, the age group 25–29 ranks the highest, but for female migrants, the age group 20–24 is the largest one (26.3%).

Figure 3.32: Age pyramids of migrants by migration type, 2004-2009



The second age pyramid in Figure 3.32 illustrates the age-sex structure of the inter-district migrants in the five years before the Census on 1 April, 2009. It can be said that the shape of the age pyramid for inter-district migrants (within a province) is similar to the inter-communal migration, especially for females. There is a slight difference among the male migrants. For inter-communal male migrants, the age group 20–24 is smaller than the age group 25–29 (10.4% versus 16.2%), and for inter-district migration, the two age groups report the same proportion (17.7%).

Data in Table 3.7 illustrate that, among inter-district migrants, female migrants account for a smaller proportion than among inter-communal migrants (56.6% versus 63.6%). Except for the older age groups with low migration rates, the age group with the highest migration was 20–24 years and two thirds of these migrants were female (65.9%). For inter-district male migration, the two age groups 20–24 and 25–29 reported the highest migrant proportions (17.7%), yet for females, the age group 20–24 reported the highest migrant proportion (26.3%).

Table 3.6: Inter-communal migrants in the five years before the 2009 Census by sex and age group

Age	Number			In-migrant proportion of population (%)			Sex structure of migrants (%)	
	Male	Female	Total	Male	Female	Total	Male	Female
5–9	54 442	51 167	105 609	9.2	5.0	6.5	51.6	48.4
10–14	42 271	39 503	81 774	7.2	3.8	5.1	51.7	48.3
15–19	45 758	94 389	140 147	7.8	9.2	8.7	32.7	67.3
20–24	61 379	270 553	331 932	10.4	26.3	20.5	18.5	81.5
25–29	95 707	244 177	339 884	16.2	23.7	21.0	28.2	71.8
30–34	89 475	110 520	199 995	15.2	10.7	12.4	44.7	55.3
35–39	65 089	65 054	130 143	11.0	6.3	8.0	50.0	50.0
40–44	42 983	43 338	86 321	7.3	4.2	5.3	49.8	50.2
45–49	32 272	34 782	67 054	5.5	3.4	4.1	48.1	51.9
50–54	23 798	26 718	50 516	4.0	2.6	3.1	47.1	52.9
55–59	13 530	15 572	29 102	2.3	1.5	1.8	46.5	53.5
60–64	7786	9254	17 040	1.3	0.9	1.1	45.7	54.3
65–69	5239	6994	12 233	0.9	0.7	0.8	42.8	57.2
70–74	4031	5622	9653	0.7	0.5	0.6	41.8	58.2
75–79	3111	4560	7671	0.5	0.4	0.5	40.6	59.4
80–84	1754	3392	5146	0.3	0.3	0.3	34.1	65.9
85–89	799	1838	2637	0.1	0.2	0.2	30.3	69.7
90+	257	1047	1304	0.0	0.1	0.1	19.7	80.3
Total	589 681	1 028 480	1 618 161	100.0	100.0	100.0	36.4	63.6

Table 3.7: Inter-district migrants in the five years before the 2009 Census by sex and age group

Age	Number			In-migrant proportion of population (%)			Sex structure of migrants (%)	
	Male	Female	Total	Male	Female	Total	Male	Female
5–9	47 235	44 097	91 332	6.4	4.6	5.3	51.7	48.3
10–14	36 010	33 058	69 068	4.9	3.4	4.0	52.1	47.9
15–19	81 381	121 542	202 923	11.0	12.6	11.9	40.1	59.9
20–24	131 250	253 977	385 227	17.7	26.3	22.5	34.1	65.9
25–29	131 123	203 914	335 037	17.7	21.1	19.6	39.1	60.9
30–34	102 394	99 838	202 232	13.8	10.3	11.8	50.6	49.4
35–39	67 269	58 196	125 465	9.1	6.0	7.3	53.6	46.4
40–44	41 810	38 750	80 560	5.6	4.0	4.7	51.9	48.1
45–49	33 715	31 899	65 614	4.5	3.3	3.8	51.4	48.6
50–54	26 478	28 219	54 697	3.6	2.9	3.2	48.4	51.6
55–59	16 950	18 694	35 644	2.3	1.9	2.1	47.6	52.4
60–64	9397	11 122	20 519	1.3	1.2	1.2	45.8	54.2
65–69	6897	8059	14 956	0.9	0.8	0.9	46.1	53.9
70–74	4392	5981	10 373	0.6	0.6	0.6	42.3	57.7
75–79	3097	4067	7164	0.4	0.4	0.4	43.2	56.8
80–84	1648	3092	4740	0.2	0.3	0.3	34.8	65.2
85–89	729	1587	2316	0.1	0.2	0.1	31.5	68.5
90+	296	736	1032	0.0	0.1	0.1	28.7	71.3
Total	742 071	966 828	1 708 899	100.0	100.0	100.0	43.4	56.6

The third age pyramid in Figure 3.32 presents the age-sex structure of inter-provincial migrants during the five years before the Census of 1 April, 2009. The age pyramid for this migration type is substantially different from the two previous migration types. Sex balance in different age groups of inter-provincial migrants is evident (both sides of the age pyramid are balanced).

Table 3.8: Inter-provincial migrants in the five years before the 2009 Census by sex and age group

Age	Number			In-migrant proportion of the population (%)			Sex structure of migrants (%)	
	Male	Female	Total	Male	Female	Total	Male	Female
5–9	52 651	46 054	98 705	3.3	2.5	2.9	53.3	46.7
10–14	45 048	40 102	85 150	2.8	2.2	2.5	52.9	47.1
15–19	257 453	355 962	613 415	15.9	19.5	17.8	42.0	58.0
20–24	485 691	624 431	1 110 122	30.0	34.3	32.3	43.8	56.2
25–29	324 441	337 041	661 482	20.1	18.5	19.2	49.0	51.0
30–34	170 027	138 932	308 959	10.5	7.6	9.0	55.0	45.0
35–39	103 907	83 977	187 884	6.4	4.6	5.5	55.3	44.7
40–44	62 990	58 254	121 244	3.9	3.2	3.5	52.0	48.0
45–49	44 984	43 772	88 756	2.8	2.4	2.6	50.7	49.3
50–54	29 223	32 613	61 836	1.8	1.8	1.8	47.3	52.7
55–59	16 523	23 178	39 701	1.0	1.3	1.2	41.6	58.4
60–64	10 046	12 563	22 609	0.6	0.7	0.7	44.4	55.6
65–69	5465	8592	14 057	0.3	0.5	0.4	38.9	61.1
70–74	3921	5521	9442	0.2	0.3	0.3	41.5	58.5
75–79	2891	4182	7073	0.2	0.2	0.2	40.9	59.1
80–84	1516	2980	4496	0.1	0.2	0.1	33.7	66.3
85–89	673	2001	2674	0.0	0.1	0.1	25.2	74.8
90+	293	995	1288	0.0	0.1	0.0	22.7	77.3
Total	1 617 743	1 821 150	3 438 893	100.0	100.0	100.0	47.0	53.0

Data in Table 3.8 show that, among all inter-provincial migrants, females account for a smaller proportion than for inter-communal and inter-district migrants (53% versus 63.6% and 56.6%). Excluding age groups beyond age 65, the group aged 15–19 had the highest female share (53.0%). For both sexes, the inter-provincial migration is concentrated mostly in the age group 20–24 (30.0% for males and 34.3% for females). Among these types of migrants, the proportion in the age group 10–14 is lower than the age group 5–9. It is clear that, the younger the children are, the higher the possibility they will migrate with adult family members.

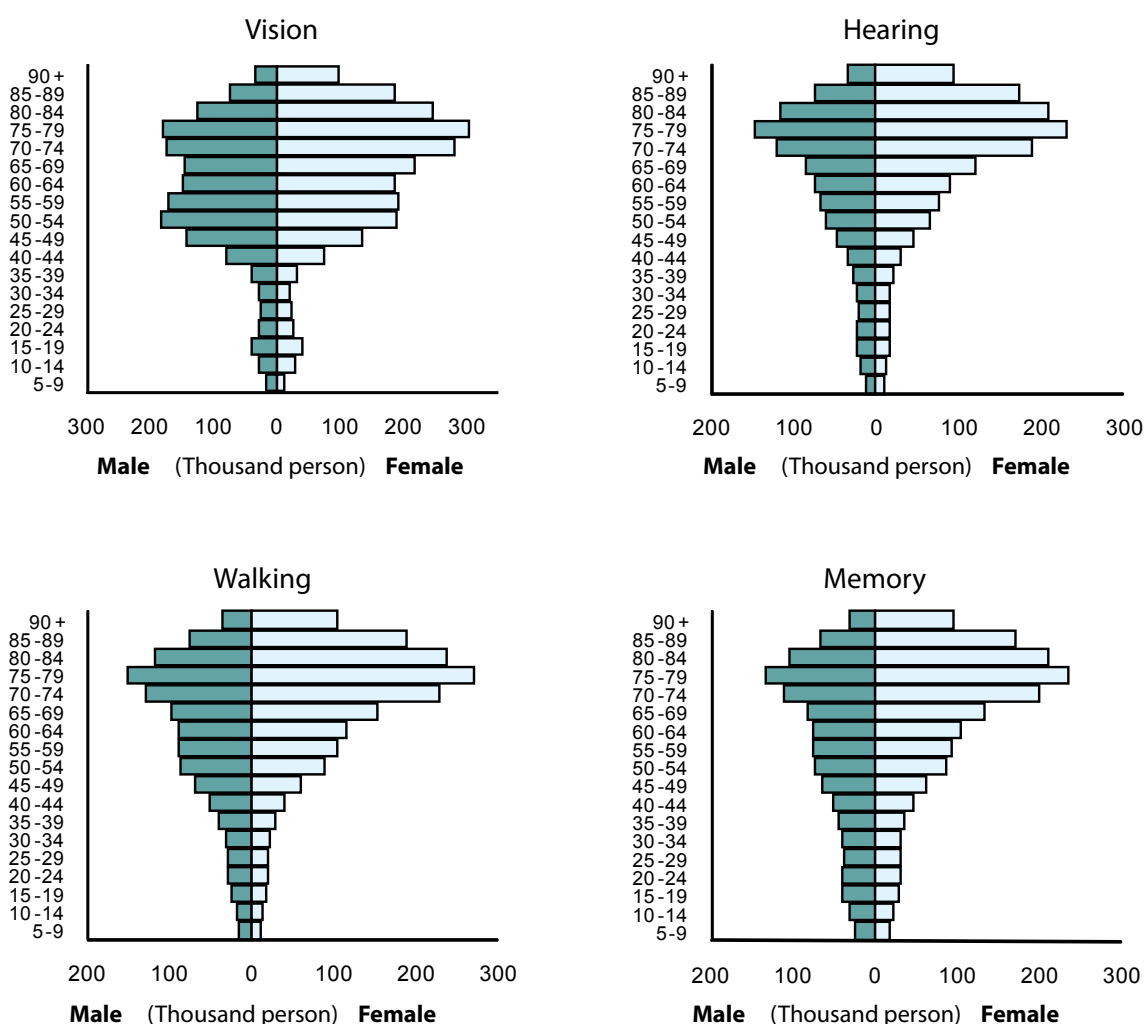
Figure 3.32 and data in Table 3.6, Table 3.7 and Table 3.8 indicate that, the greater the migration distance, the smaller the proportion of children among migrants. Among inter-communal migrants, the proportion of children aged 5–9 accounts for 6.5%, this proportion declines to 5.3% for inter-district migration and further to 2.9% for inter-provincial migration. For children aged 10–14 years,

the proportions are 5.1%, 4.0% and 2.5% respectively. The proportions of the elderly (aged 60 years and older) among migrants are insignificant, accounting for only 3.6% of inter-communal and inter-district migration, and only 1.8% of inter-provincial migration.

3.5.3 Age-sex structure of the disabled population

The Viet Nam Population and Housing Census 2009 collected information on people living with disabilities in the population. Respondents were asked four small questions (Parts of Question No. 11) regarding their vision (with glasses), hearing, walking and memory or attention abilities. Enumerators tick one of four categories: no difficulty, some difficulty, great difficulty, and impossible. Figure 3.33 and Table 3.9 present summary results for each type of disability.

Figure 3.33: Population pyramids by types of disability in Viet Nam, 2009



According to estimates from sample Census data, the population with vision disabilities is the largest (3947.5 thousand people), this group is followed by the population with walking-disabilities (2901.4 thousand people), with memory disabilities (2762.9 thousand people) and finally with hearing disabilities (2451.5 thousand people). In general, for all types of disability and for each sex, the absolute

number and proportion of people living with disabilities increases with age and peaks at the age group 75–79. After these ages, the size of the population with disabilities decreases, mostly because the population size declines. However, for the male population with vision disabilities, the proportion disabled in the age groups 55–59, 60–64 and 65–69 is lower compared with younger age groups.

Regarding number of people living with disabilities, females suffer from disability more than males. Among four types of disability, the proportion female does not vary much and accounts for from 57.9% (vision disabilities) to 59.5% (walking difficulties). However, if divided into three subgroups, under 15, 15–59 and age 60 and older (Table 3.9), it can be seen that in the first two age groups, the number of males living with disability is higher than females, but the difference is not high, especially for the age group 15–59. In this age group, males and females report similar proportions of disability (50.1 versus 49.9%). Gender differences are highest among people with walking disabilities. Among the age group 15–59, males accounted for 53% of the total population with walking disabilities.

Table 3.9: People with disabilities by type of disability in Viet Nam, 2009

	Number			Age structure of people with disabilities (%)			Sex structure %	
	Male	Female	Total	Male	Female	Total	Male	Female
Vision								
5–14	43 964	41 047	85 011	2.6	1.8	2.2	51.7	48.3
15–59	734 681	733 019	1 467 700	44.2	32.1	37.2	50.1	49.9
60+	882 324	1 512 441	2 394 765	53.1	66.1	60.7	36.8	63.2
Total	1 660 969	2 286 507	3 947 476	100.0	100.0	100.0	42.1	57.9
Hearing								
5–14	30 981	22 866	53 847	3.1	1.6	2.2	57.5	42.5
15–59	327 613	309 215	636 828	32.5	21.4	26.0	51.4	48.6
60+	649 865	1 110 998	1 760 863	64.4	77.0	71.8	36.9	63.1
Total	1 008 459	1 443 079	2 451 538	100.0	100.0	100.0	41.1	58.9
Walking								
5–14	32 772	24 097	56 869	2.8	1.4	2.0	57.6	42.4
15–59	451 001	399 445	850 446	38.4	23.1	29.3	53.0	47.0
60+	691 529	1 302 550	1 994 079	58.8	75.5	68.7	34.7	65.3
Total	1 175 302	1 726 092	2 901 394	100.0	100.0	100.0	40.5	59.5
Memory								
5–14	56 020	40 117	96 137	5.0	2.5	3.5	58.3	41.7
15–59	468 346	444 670	913 016	41.5	27.2	33.0	51.3	48.7
60+	604 182	1 149 516	1 753 698	53.5	70.3	63.5	34.5	65.5
Total	1 128 548	1 634 303	2 762 851	100.0	100.0	100.0	40.8	59.2

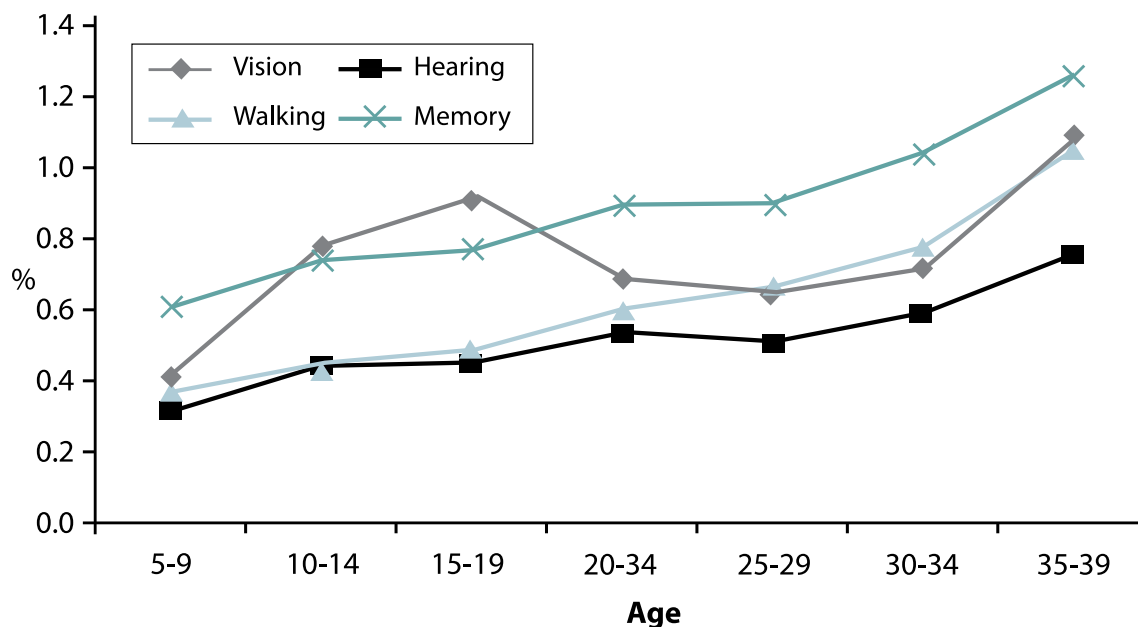
In general, the data show that, among all types of disability for both sexes, prevalence of disability increases by age. In the age group 5–14, the proportion of any disability varies from 0.38% (hearing), 0.48% (walking) to 0.6% (vision), 0.68% (memory) and 1.32% (suffer from at least one disability). For the age groups 30–59, the respective proportions are 1.6%, 2.2%, 4.0%, 2.2% and 6.6% and for the group aged 60 and above, prevalence reaches 23%, 26%, 31%, 23% and 43% respectively for the different types of disability.

One point to take note of is the prevalence of vision disabilities in the age group 10–19 is much higher than in the age group 20–24 (Figure 3.34). This indicates an increase in vision problems (mostly myopia) among children and the young in the last 5–10 years.

Table 3.10: Prevalence of disabilities by severity and age group in Viet Nam, 2009

Age group	5–14	15–29	30–59	60+	Total
Vision					
Difficult	0.49	0.63	3.68	26.62	4.40
Very difficult	0.08	0.09	0.22	3.88	0.51
Impossible	0.03	0.04	0.06	0.77	0.12
Total	0.60	0.76	3.96	31.27	5.03
Hearing					
Difficult	0.23	0.31	1.32	18.64	2.50
Very difficult	0.08	0.10	0.19	3.77	0.49
Impossible	0.07	0.09	0.09	0.58	0.13
Total	0.38	0.50	1.60	22.99	3.12
Walking					
Difficult	0.22	0.34	1.68	19.96	2.79
Very difficult	0.09	0.14	0.38	4.59	0.67
Impossible	0.10	0.09	0.13	1.49	0.24
Total	0.41	0.57	2.19	26.04	3.70
Memory					
Difficult	0.37	0.44	1.67	18.52	2.70
Very difficult	0.17	0.23	0.33	3.55	0.59
Impossible	0.14	0.17	0.18	0.83	0.23
Total	0.68	0.84	2.18	22.90	3.52
Maximum of all 4 types					
Difficult	0.88	1.19	5.46	33.54	6.06
Very difficult	0.24	0.36	0.78	7.39	1.20
Impossible	0.21	0.26	0.35	2.34	0.49
Total	1.32	1.81	6.58	43.25	7.74

Figure 3.34 Prevalence of 4 types of disability by age group from 5–9 to 35–39 in Viet Nam, 2009



In general, among all types of disability, the proportion female is higher than male. The sex differential of disabilities varies by age. For all types of disability, males account for a higher share of the disabled than females for ages under 60, and vice versa, females account for a higher share of the disabled among people aged 60 and older.

3.6 AGE-SEX PROJECTIONS OF THE POPULATION IN VIET NAM

We can assert that Viet Nam's population has passed through or at least is passing through the post-demographic transition period⁵ and has entered a period of population aging. The "demographic transition" or "population transition" are terms demographers use to describe the process of transformation from high birth and death rates in low income countries to low birth and death rates in high income countries (Casterline 2003: 210). This can be seen through the series of age pyramids from 1979 to 2009. In order to project the age-sex structure prospects of the population in the future, it is possible to use the UN projections in "World Population Prospects". However, for inputs into Viet Nam's population projections, the UN used the 1999 Census,, which is out-of-date and is greatly biased towards the status-quo. Even in the latest version in 2008, the discrepancy between the UN prospects with the data of the Viet Nam Population and Housing Census is about 2.2 million people.

In order to study of the age-sex structure prospects of population in Viet Nam, the authors have applied the Spectrum (Demproj) software to project the population until 2059 (50 year) with the following input information:

5 UNFPA. Population and Development in Viet Nam: Toward a new Strategy 2011-2020, Hanoi, December 2009, page 16

- 1) Population by sex and five-year age groups: Results of the Population and Housing Census at 0:00, on 1 April 2009 (complete population Census):
- 2) Fertility: Total fertility rate (TFR)
 - 2009: 2.03 children/woman
 - 2024: 1.80 children/woman remaining constant until 2059.
- 3) Mortality: Life expectancy at birth (e0)
 - In 2009: 70.2 years for males and 75.6 years for females
 - In 2030: 75.4 years for males and 80.0 years for females remaining constant until 2059;
- 4) Sex ratio at birth (SRB):
 - 2009: 110.6;
 - 2020: 115.0;
 - 2030: 105.0, remaining constant until the end of the projection period.
- 5) International migration: Net migration rate equal to 0.

Hypotheses used in the projections are equivalent to the varying hypotheses in the medium variant of the UN (the main change is in the input data). Key results are presented in the appendices. The results are used to construct the age pyramids in 2034 and 2059, and to calculate the dependency ratios and aging indexes for the years from 2014 to 2059.

Because population in Viet Nam continues to age, the median age has increased considerably. In 1950, the median age of the Viet Nameese population was 24.6; in 1970 it had declined to 18.0; in 2000 it had increased to 23.1 (UNFPA 2009:17); by 2009 it had increased to 28.0 years. In the future, the median age of Viet Nam's population will increase greatly. Within ten years from 2009 to 2019, the median age is expected to increase by 4 years, from 28 to 32 years of age, and to increase another 5 years during the following decade (from 32 years in 2019 to 37 years in 2029). However, after 2029, the median age is likely to increase more slowly, with an increase of 3 years for the decade from 2029 to 2039 (from 37 to 40 years of age), and then an increase of 2 years for the following two decades (from 40 years in 2039 to 42 years in 2049 and 44 years in 2059).

Figure 3.35: Population pyramids in Viet Nam, 1979, 2009, 2034 and 2059

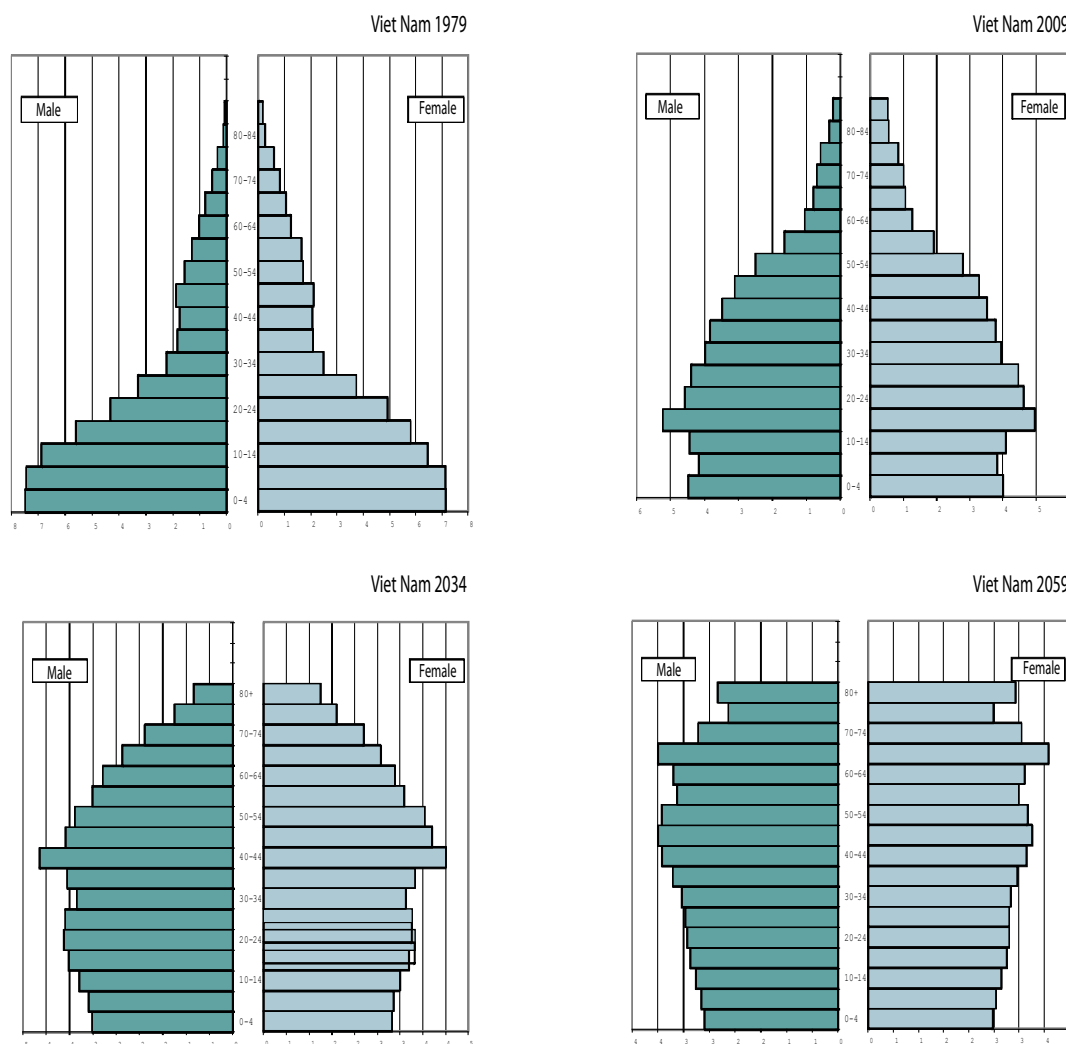


Figure 3.35 presents the age pyramids of population in Viet Nam in 1979, 2009, 2024 and 2059. The age pyramids for 1979 and 2009 were constructed using population data from the 1979 and 2009 Censuses. The age pyramids in 2034 and 2059 are based on the projection results as mentioned above. Due to continuous declines in fertility, then maintenance of fertility at low levels, by 2034 (after 25 years), the age pyramid will be transformed into a jar shape. It is clear that the population of Viet Nam will be aging dramatically. By 2059, after 50 years, the age pyramid of Viet Nam's population will have a drum shape with the drum face being even wider than the drum base.

a) Projection of total population of Viet Nam

The difference between total births and total deaths will determine the rate of natural increase of the population regardless of the TFR and actual life expectancy. Normally, paralleling the demographics

transition, population will continue to increase for several decades after reaching “replacement fertility rates”. This is called population momentum. Population momentum is the change in the population growth rate after changes in reproductive behaviour and mortality rates have occurred. Population momentum takes place during the process of age structure changes, which mean that when a population has grown rapidly over a long period, it will tend to be a young population, and even if fertility declines to replacement level, the population will continue to grow for several decade before achieving a zero growth rate (Feeney 2003: 647).

Because of high fertility in previous years, the proportion of women aged 15-49 has increased continuously from 41.3% in 1970 (UNFPA 2009:18), to 45.1% in 1979; 48.4% in 1989; 53.5% in 1999 and 57.3% in 2009. In 2009, the proportion of women aged 15-49 peaked at a maximum value. In 2010, the proportion of women aged 15-49 has fallen slightly to 57.2%. After 25 more years, by 2034, the proportion of women aged 15-49 will decline to 48.6% and by 2059, this figure will be down to 41.6%, which is similar to the proportion in 1970.

Even though the proportion of women aged 15-49 peaked at the maximum value in 2009, the absolute number of women will continue to increase from 24 485 000 in 2009 to the maximum at 25 910 000 in 2028. After this year, the number of women aged 15-49 will steadily decreases and will decline to approximately 21 841 000 in 2059.

With regard to the female age group with the highest fertility in 2009 (25-29 years of age), it can be seen that, the proportion of women in this age group will slowly increase. In particular, it is projected to increase from 8.9% in 2009 to 9.3% in 2018, equivalent to an increase of 0.4 percentage points over nine years, after which it will decrease continuously, down to 6.4% in 2034 and to only 5.6% in 2059. Considering absolute numbers, the number of women aged 25-29 will increase from 3 885 00 in 2009 to the highest value of 4 400 000 in 2018, indicating an increase of 515 000 people over 9 years, or on average, about 46 000 per year.

If the TFR continues to decline to 1.8 children per woman in 2024, though the total number of women aged 15-49 and the number of women in the highest fertility ages will continue to increase, but the number of births will constantly decrease, from 1 564 000 in 2009 to 1 234 000 in 2039 and only 1 070 000 in 2059. Even if the fertility rate remains constant (TFR=2.03), the number of births will only increase to a maximum of 1 647 000 in 2014, meaning that there will be an increase over current births of about 83 000 newborns every five years and, on average, 17 thousand per year.

Table 3.11 shows that, even if the total fertility rate remain unchanged, the crude birth rate of Viet Nam will decline constantly, from 18.1‰ in 2014 to 13.4‰ in 2034 and only 12.3‰ in 2059. In the case that the TFR decreases continuously till it reaches 1.8 children per woman in 2024, the crude birth rate would decline greatly to 11.7‰ in 2034 and 10.1‰ in 2059.

Table 3.11: Projection of TFR and CBR in Viet Nam, 2014-2059

Year	Newborns ('000)		CBR (‰)	
	TFR 2024=1.8	TFR constant (2.03)	TFR 2024=1.8	TFR constant (2.03)
2014	1518	1647	16.7	18.1
2019	1434	1588	15.0	16.5
2024	1303	1466	13.1	14.6
2029	1237	1394	12.1	13.5
2034	1234	1415	11.7	13.4
2039	1234	1456	11.5	13.5
2044	1198	1451	11.1	13.3
2049	1140	1401	10.6	12.8
2054	1093	1352	10.2	12.4
2059	1070	1334	10.1	12.3

According to our projection, because the number of births is higher than the number of deaths, the population of Viet Nam will continue to increase until 2046. Thus, even though replacement fertility rate has been reached, the population of Viet Nam will continue to increase in the next 40 years and then gradually decrease.

Figure 3.36: Trend and projection of total dependency ratio in Viet Nam, 1979-2059

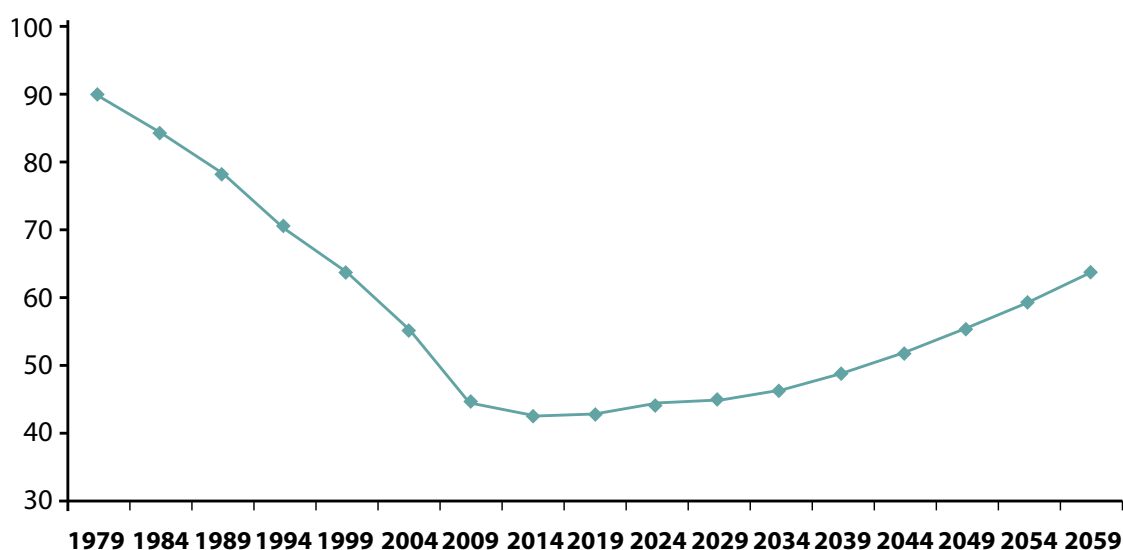
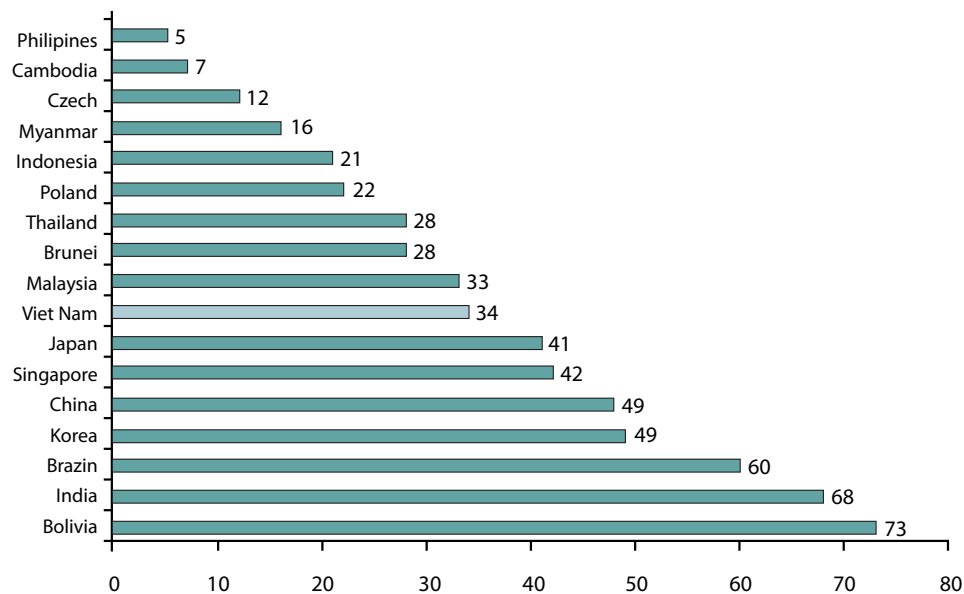


Figure 3.36 presents the projections of total dependency ratio of the population of Viet Nam (using the aged dependency threshold of 65+ years) in the next 50 years, based on the above population projection results. Similar to many other populations in the world, the total dependency ratio of Viet Nam's population in the 1970s was very high, approximately 90, which means that on average, one working-age person had to support nearly one non-working-age person. The total dependency ratio has continually decreased, reaching 50 in 2007, indicating that every two working-age persons were available to support one non-working-age person. In other words, the population of Viet Nam had entered the era of "golden population structure" or "population bonus".

Figure 3.37: Duration of the period of "golden population structure" for selected countries



The total dependency ratio of Viet Nam is projected to continue to decrease to the minimum value of 43 by about 2015. That is in 2015, every 2.3 working-age persons would support only one non-working-age person. After 2019, the total dependency ratio will gradually increase, back to 50 in 2041 and continue increasing from then on. Thus, the period of "golden population structure" in Viet Nam will last for about 34 years, a medium duration in comparison to other countries. In comparison with ASEAN countries, the period of "golden population structure" in Viet Nam will be quite long, only second to Singapore in terms of duration (Figure 3.6.3). After 2040, the total dependency ratio of Viet Nam will increase quickly to 63.6 in 2059, indicating that for every 1.6 working-age persons there will be one non-working-age person.

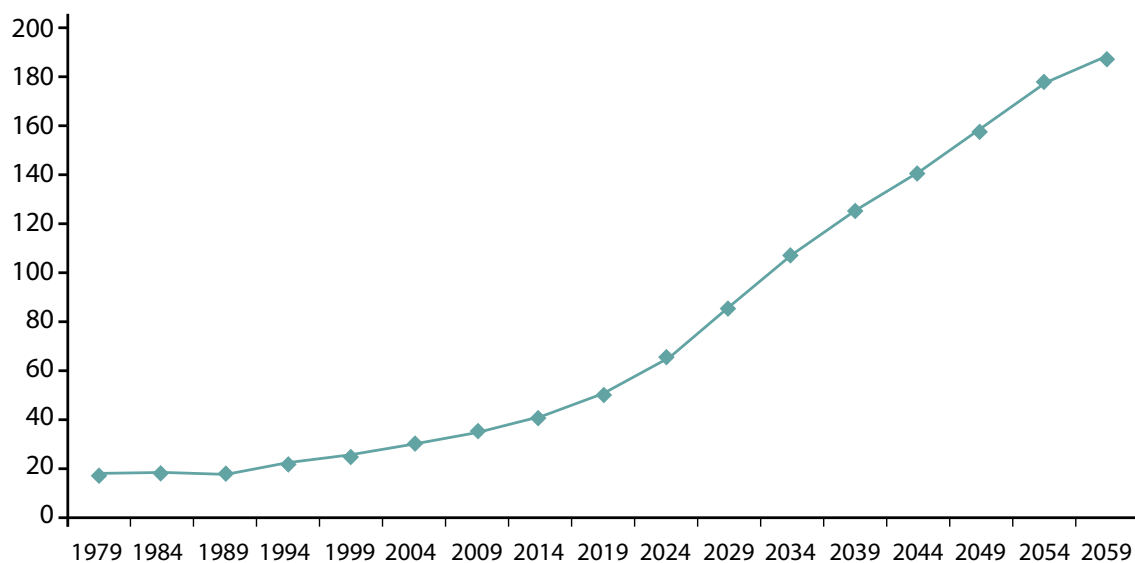
b) Population aging

Because life expectancy has increased to a relatively high level while the total fertility rate has decreased continuously and is being maintained at a low level, the population of Viet Nam is aging. If people aged 60 or older are regarded as the old-age population, three decades ago, in 1979, the aging index of Viet Nam was 16.6, which means there was only one aged person for every 10 children under age 15. In 2009, the aging index of Viet Nam had increased to 35.5, meaning that for every 3 children under age 15, there is an aged person. In 2034, the aging index is projected to

increase to 106.6, indicating only one child for every 1.1 aged persons, three times higher than the current index. In 2047, the aged population will be 1.5 times higher than the population of children in Viet Nam (see Figure 3.38).

Population aging has not been an urgent issue in Viet Nam so far but needs to be taken into account soon as the aged population is increasing quickly in both numbers and proportion. The total number of people aged 60 and older in Viet Nam was 7.5 million in 2009 and is projected to increase to almost 11 million by 2019, 17 million by 2029, 22.3 million by 2039, 28.2 million by 2049 and more than 31 million by 2059. As most aged people in Viet Nam tend to be economically dependent and often suffer from multiple chronic and acute medical conditions, they will face significant difficulties if social welfare support policies are insufficient or ineffective.

Figure 3.38: Trend and projection of aging index (60+) in Viet Nam, 1979-2059



c) Sex ratio

As analyzed in Section 3.4, the sex ratio of Viet Nam's population is strongly influenced by consequences of the long period of war from the 1950s through the 1970s. The peaceful period in Viet Nam in the last three decades has led to an increasing sex ratio. In addition, the considerable increase in the sex ratio at birth has contributed significantly to the total sex ratio of the present and future population.

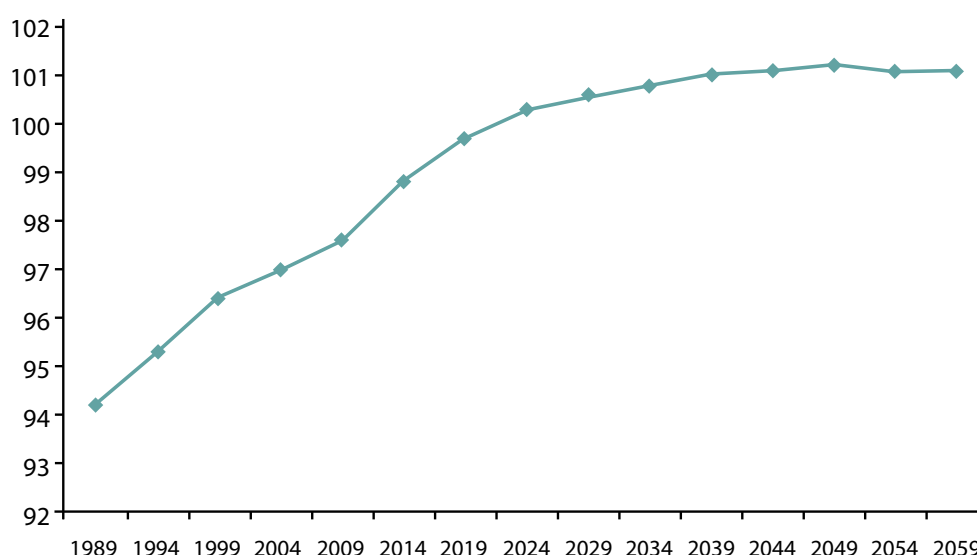
The high sex ratio at birth in Viet Nam indicates the existence of gender discrimination. The sex ratio at birth is also used to indicate prospects of sex imbalance for the population in the future. The unusual excess of boys (more than 105 boys per 100 girls) in the last several years will lead to a slight surplus of young male adults in the next 20 years or so. The situation will become more serious if the sex ratio at birth continues at the current high level or increases further.

Population projection, as presented above, can help to evaluate the prospects of the total sex ratio of the population in Viet Nam. The projection is based on the hypothesis that the sex ratio at birth in

Viet Nam continues to increase to 110 in 2020 and then, because of more effective policies to reduce sex selection, the sex ratio at birth will return to the normal level (105) by 2030.

Figure 3.39 presents the general sex ratios of Viet Nam's population according to the 1989, 1999 and 2009 Censuses and the projections based on the hypotheses mentioned above (in Section 3.5). The sex ratio of the population has increased from 94.2 in 1989 to 97.6 in 2009. According to the projection, the sex ratio will reach 100 (number of males equal to the number of females) by 2021. After 2021, the male population will slightly exceed the female population, and the total sex ratio will peak at 101.2 in 2049 and decline steadily afterward, to 101.1 in 2054 and remain relatively stable around this level in the following years.

Figure 3.39: Trend and projection of sex ratio in Viet Nam, 1989-2059



3.7 SUMMARY AND REMARKS

The age structure of Viet Nam's population in 2009 was typical of a post-demographic transition population in which high birth and death rates have been transformed to low birth and death rates. The decline of the birth rate narrows the age pyramid base while the increased life expectancy of the population slows down the narrowing at the top of the pyramid.

There is a clear difference between rural and urban age structure. In rural areas, the age group with the highest proportion of the population is the group aged 15–19, which is substantially larger than the adjacent younger and older age groups. In urban areas, the age group with the highest proportion is the age group 20–24, but this group is only slightly larger than the adjacent younger and older age groups. The age pyramid of the urban population is strongly influenced by in-migration, which contributes to a high proportion of people in working ages.

The age-sex structures of population in different regions and province are affected not only by birth and death rates, but also by migration. The age pyramids of the Northern Uplands and Central Highlands are typical of highland populations with high birth and death rates. However, because the birth rate in the Northern Midlands and Mountains is decreasing more rapidly than in the Central

Highlands, the pyramid base has narrowed more abruptly. The age pyramid of population in the Central Highlands is also influenced by in-migration.

The age pyramids of the Red River Delta and Mekong River Delta are typical for lowland populations with low birth and death rates, leading to narrowed pyramid bases and relatively wide pyramid tops, compared with other regions. The Red River Delta has experienced negative net migration, with out-migrants primarily in working ages leading to a substantial narrowing of the pyramid body.

The age pyramids of the North and South Central Coast and the Southeast are characteristic of populations with high migration in opposite directions. The North and South Central Coast reports a high rate of out-migration, concentrated in young ages so the population in the age groups 20–24 and 30–34 decline suddenly for both males and females. In contrast, the Southeast has a high rate of in-migration concentrated in young ages, so the pyramid body is wide. This is the only region of the country for which the age group 20–24 has the highest proportion (in all other regions the age group 15–19 has the highest proportion).

Compared with 1999, the proportion of the population under age 20 declined while the population aged 20–59 increased considerably. The change in the age pyramid shape since 1979 reflects a very clear population aging process in Viet Nam with the aging index increasing gradually, from 16.6% in 1979 to 24.3% in 1999 and reaching 35.5% in 2009.

The total dependency ratio of Viet Nam has declined dramatically since 1979. If independent ages are defined between 15 and 64, the total dependency ratio of Viet Nam reached a “golden population structure” (50%) by the end of 2007, and the ratio has now reached 44.7%. The total dependency ratio in Viet Nam has declined mostly because of fertility decline. The decrease in mortality has contributed positively to the aged dependency ratio, but only slightly.

Among Viet Nam’s six regions, the Southeast, Mekong River Delta, Red River Delta, and Northern Midlands and Mountains are experiencing a “golden population structure”. The North and South Central Coast is expected to enter a period of “golden population structure” in 2011 since the total dependency ratio currently is only 50.4%. In 2009, 43 out of 63 provinces in Viet Nam reported total dependency ratios under 50%, which means they are experiencing a “golden population structure”. The province with the lowest total dependency ratio was Binh Duong, at 28%. Among the other 20 provinces, 9 have a total dependency ratio under 55% and will enter the period of “golden population structure” over the next five years. The other provinces have total dependency ratios that are not extremely high. The province with the highest total dependency ratio is Lai Chau, at 71%.

The sex ratio of the population in Viet Nam has gradually decreased over the 60 years from the 1930s to 1990s, mostly because of the consequences of war. The peaceful period in last 30 years and the increase in the sex ratio at birth have led to a recovery of greater sex balance, with 97.6 males for every 100 females in 2009.

In the future, population in Viet Nam will age very rapidly. In 2009, the size of the aged population (60+) was one third the size of the child population (under 15). According to the population projection, by 2030, the size of the aged population will be equal to that of the child population. The difference in the number of aged people and children will continue to increase. Compared to the child population, the aged population will be 1.5 times larger by 2047, and two times higher by the late 2060s.

The number of women aged 15–49 will continuously increase until 2028 (an increase of about 75 000 women each year) and will decline thereafter. However, the proportion of women aged 15–49 has already peaked in 2009. Thus even if the TFR remains at the present level (TFR=2.03), the number of newborns will increase over the next ten or more years, but the crude birth rate of the population in Viet Nam will gradually decrease.